Rubber Journal and International Plastics

VOL. 139 NO. 26 DECEMBER 24 1960 Price 1s. Weekly

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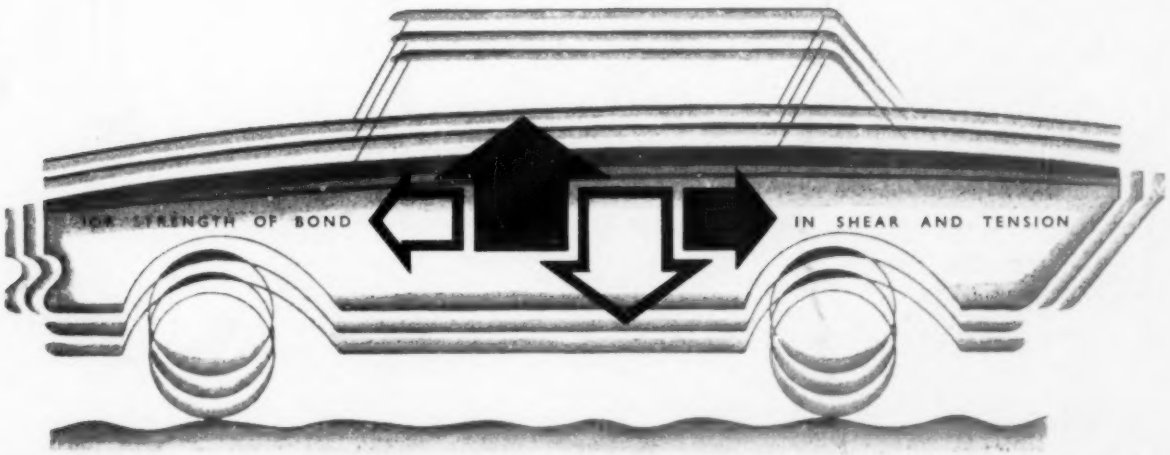

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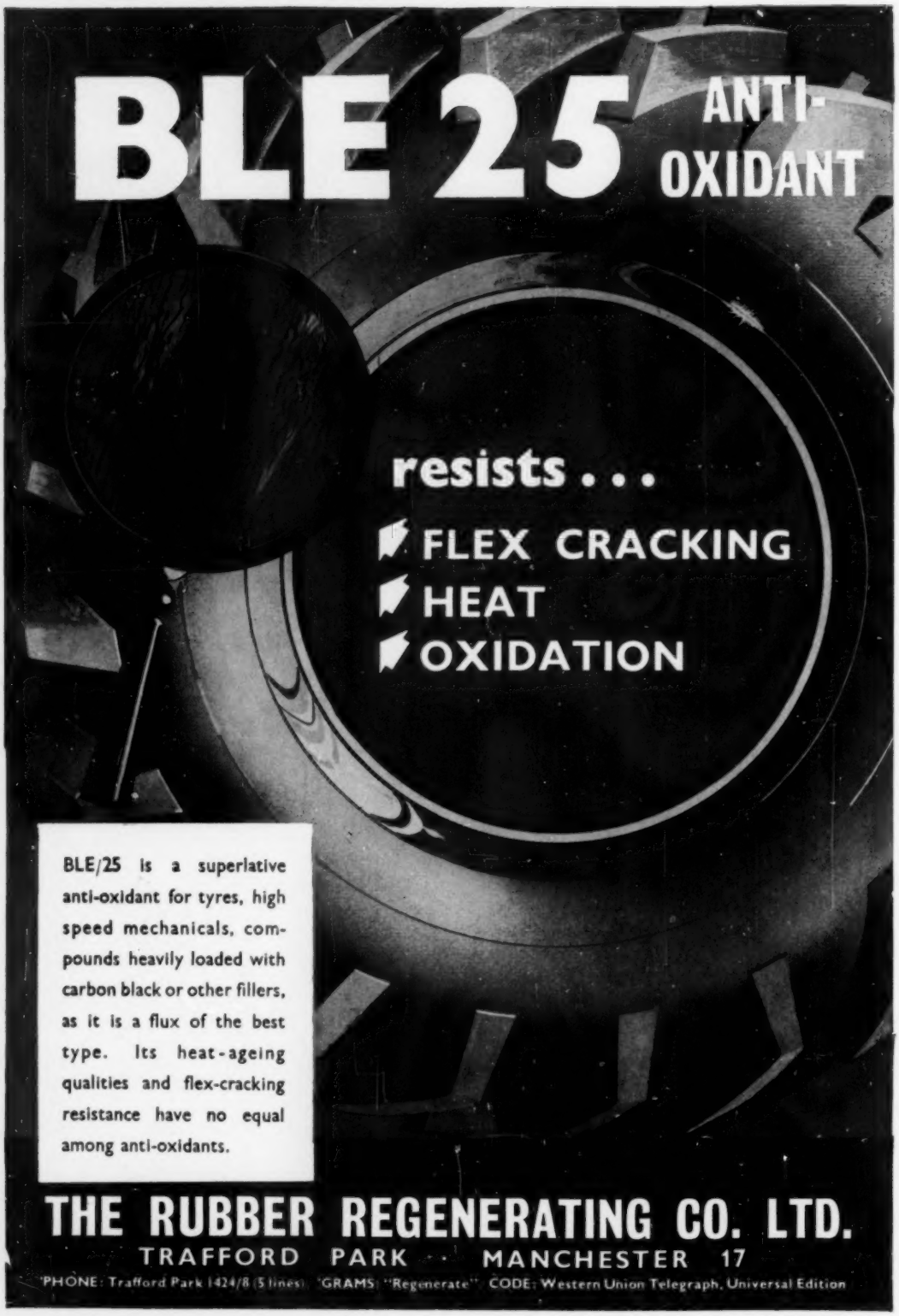
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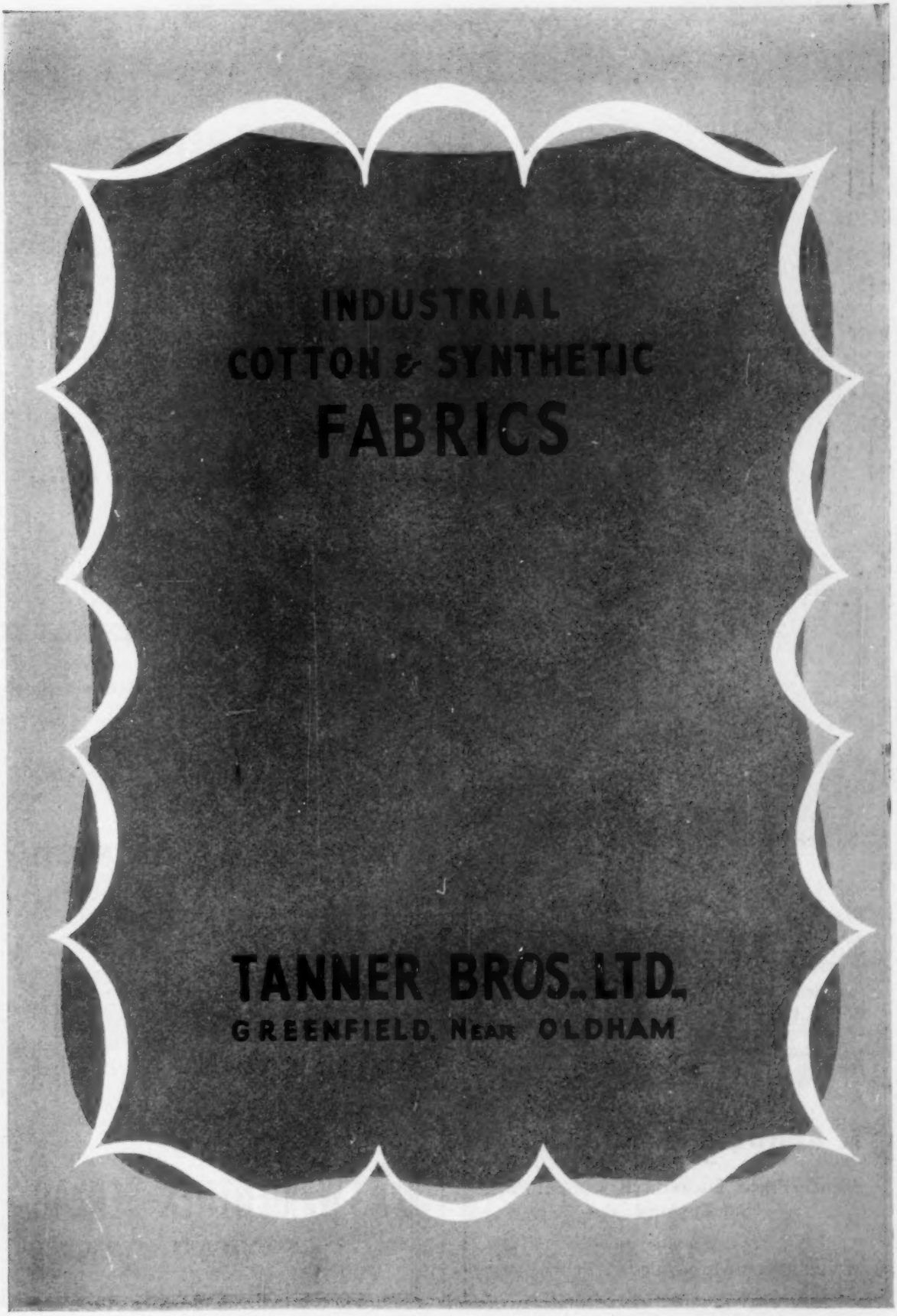
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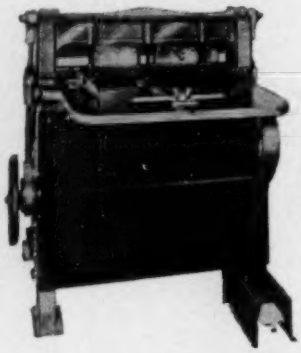

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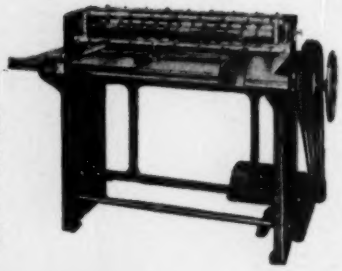

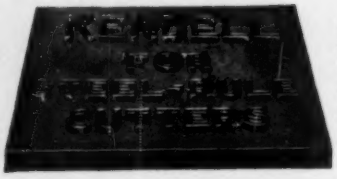

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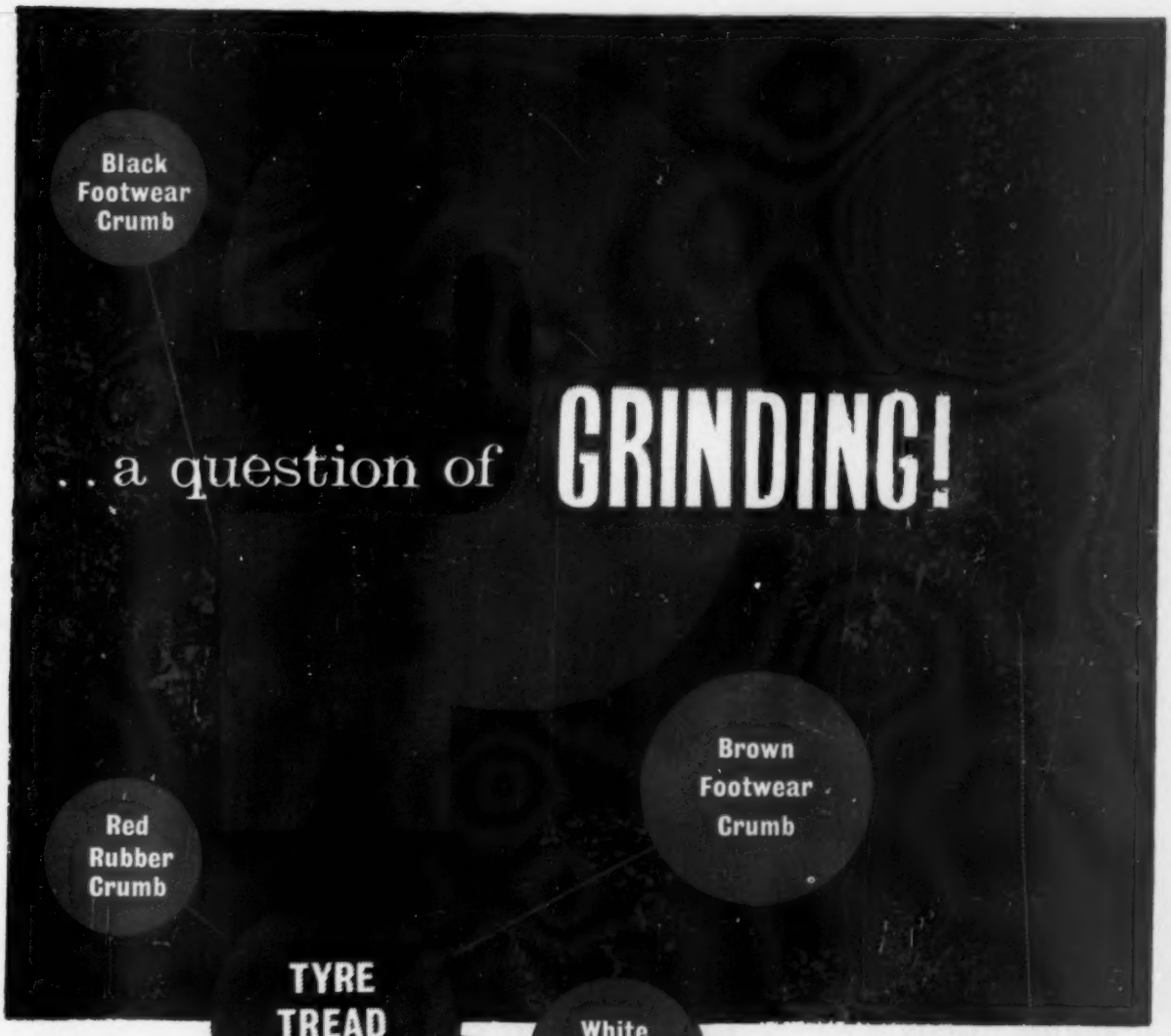

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Rubber Journal and International Plastics

Volume 139 **Price 1s. Post free 1s. 4d.** **No. 26**

IN ITS 77th YEAR

December 24 1960

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NOTES of the WEEK

The IRI Overseas

THE annual dinner of the Institution of the Rubber Industry is always a most important occasion for everyone connected with the industry. This year's dinner (reported elsewhere in this issue) was an important Commonwealth occasion. It was attended by officials of the governments of Canada, Malaya, Ceylon, South Africa and Rhodesia and Nyasaland. This is a reflection of the active work that has been carried out overseas by the IRI in the past year. Two new sections—one in Rhodesia and the other in South Africa—have been established and it seems likely that in the next few months the Malayan section, which was disrupted during the emergency, will be re-activated. A Canadian section is also contemplated, but from remarks made by the agent-general for Ontario at the dinner, it seems that negotiations are at a rather delicate stage.

A Good Year

THIS is just one aspect of what has been a particularly good year for the Institution. Besides the two overseas sections, a new branch was founded in the UK—IRI Humberside—and there has been a net increase in membership of 9%, bringing it up to 3,260. Much work has also been done in the important field of education and training: the council has reported that training facilities are now available in Birmingham and that a new Licentiateship syllabus with an engineering bias has been prepared.

Local sections continue to increase the scope of their activities: this can be seen from last week's *RJIP* where, in *Views and Reviews*, Charles Jennings showed that there are no less than 84 lectures in the current programme. Subjects range from adhesion and bonding, and polymer development to organization and costing.

This bringing together of many activities into a coherent scheme, both at home and overseas, is of great benefit to every individual member. Rising costs make it likely that the subscription rate, which has been the same since 1951, will have to be raised. No-one should grumble. We are getting value for money.

Weight of Opinion

A DOCTOR in East London collected all the advertising literature posted to him by drug firms in one year. The total weight was 111lb. 3oz.—13oz. short of a cwt., and the cost of posting it added up to £17 12s. 4d. The doctor came to the conclusion that it would be better if drug information were sent out in a standard form by a central bureau maintained by the industry.

This has led us to speculate on our own account on the amount of material that pours into our offices daily. By means of a complex integration whose intricacies are known only to our technical editor, it has been calculated that we receive close on half a cwt. of technical data alone. News items, leaflets, brochures, photographs and so on must tip the scales at half a ton. Add to this books and publications—which themselves contain the rendered down portions of many cwts. of post—and it now seems a wonder to us that we are not buried beneath this weight of opinion.

Resins and Bandicoots

BUT, unlike the doctor, we are in a way the sort of bureau he contemplates. A good proportion of *RJIP* is composed of information coming in from all over the world, which is carefully sifted and presented. There may be a request for a polyester resin with a fast hardening rate for lay-up moulding, rubbing shoulders with a monograph on the damage done to rubber trees by bandicoots. Articles on accelerators and antioxidants jostle with news of a merger from a Canadian correspondent, data about a dust control unit and pictures of a new colour laboratory.

Everything has to be tested and assessed, and this is probably the point to say (in time for new year resolutions) that the weight of material could be considerably reduced in some cases before it even comes into the office. A few words describing what has to be described and nothing more, on a plain sheet of paper, are often better than a lush verbal profusion sprouting on thick glossy paper.

Christmas Greetings
to all our Readers

NEWS *Briefs*

US POLYTHENE PREDICTION—GOODYEAR UNION AGREEMENT—BAYER IN LONDON—SBR PROBLEMS IN JAPAN—A NEW NYLON—BATON ROUGE VINYL

●**Italy** — About 500 tons of natural RSS rubber from the Government stockpile have been sold by public tender by the Transport Ministry.

●**United States** — The Chemstrand Corp. has announced the development of a 'superior new nylon' engineered specifically for use in aircraft, automobile and truck tyres. Called Chemstrand nylon type FRN, the new yarn is claimed to surpass any nylon yarns currently used in fatigue resistance. It will not require any deviation from present methods of tyre manufacturing, the company said.

●**Japan** — Banpo Polyester Co. of Osaka has concluded an export contract to supply a million sheets of glass fibre reinforced polyester to USA. This is thought to be the biggest order of its kind ever contracted by a Japanese manufacturer to USA. The company is already shipping 30,000 GRP sheets to Canada.

●**United Kingdom** — Sir Miles Thomas has resigned from the board of British Glues and Chemicals due to 'substantially divergent views on matters of basic policy.' Sir Miles is reported to have said that he can usefully employ the time made available in furtherance of his activities as chairman of Monsanto Chemicals and other interests.

●**Western Germany** — Farbenfabriken Bayer AG are said to be making final preparations for their projected quotation on the London stock exchange. Shares totalling DM1.5m. have been marked for the introduction, and a prospectus is being printed.

●**Japan** — Sources in Tokyo predict a quick growth in the use of ABS resins in Japan. Up to now finished products have been made on a test basis from material supplied by pilot plants. Mitsubishi Monsanto and Toyo Koatsu are constructing 200 ton plants, and other firms who are to make the material include Dianippon Celluloid and Ashia Dow.

●**United States** — Construction of Monochem Inc's. acetylene and vinyl chloride plant is expected to begin shortly at Baton Rouge, Louisiana. The plant, which is due to be completed late in 1962, will have a capacity of 80m. lb. of acetylene and 150m. lb. of vinyl chloride. Monochem is a joint subsidiary of Borden and US Rubber.

●**Southern Cameroons** — A big increase in rubber exports in October has been reported. 656,000lb. of rubber were shipped against 237,112lb. in October last year.

●**United States** — A union-management agreement calling for new production rates has cleared the way for the investment of close to $10m. by Goodyear in modernizing a big tyre plant. This was announced jointly by Goodyear and the United Rubber Workers' Union. The agreement calls for new production rates based on a piecework system designed to make operations more competitive. Last October Goodyear warned the local union of the United Rubber Workers that it might have to close the plant unless output efficiency could be brought up to the level of factories elsewhere.

●**Japan** — A spokesman for the Japan Synthetic Rubber Co. has said that the company is planning to step up exports of SBR to South East Asian countries and Australia. The company has so far exported a total of 200 tons of synthetic rubber to South Korea, Formosa, Hong Kong, the Philippines and Australia. It hopes to increase exports to 1,000 tons monthly and the Soviet Union is also considered a possible market. The company started making synthetic in April this year but had to suspend production last month until January because of the large stock accumulation.

●**Thailand** — The Thai Ministry of Agriculture has recently imported from Malaya enough high-quality rubber seeds to plant about 10,000 acres. Some have already been distributed to experimental stations for germination and distribution. Seeds are being provided free to plantation owners.

●**United States** — An increase of 10% in sales of conventional polythene is predicted for 1961 over this year by V. D. McCarthy, director of plastic sales for the US Industrial Chemicals Co. Some industry spokesmen forecast a sales total for 1960 equal to the 1959 record of 1,100m. lb. Film and sheeting demand should rise next year to 465m. lb., Mr McCarthy says, as against an estimated 400m. in 1960.

'I've been thinking, if these Americans are so damn keen on getting hold of British firms, why the heck can't they take over this heap' — 516

Patent Action by General Tire

SUITS FILED AGAINST GOODYEAR AND US RUBBER

THE General Tire and Rubber Co. has filed suits in USA against the Goodyear Tire and Rubber Co. and the US Rubber Co. for alleged infringement of its recently issued patent No. 2,964,983. This patent is for oil-extended rubber compositions for making tyre treads. The suits were filed in the Federal district court in Cleveland.

William O'Neil, president of General Tire, said the suits were filed against only Goodyear and US Rubber largely for procedural considerations. They were regarded in industry circles as a technical legal move to establish the patent's validity.

Damages Asked For

The suits asked that other rubber companies be 'enjoined from using the patent,' and that damages and other relief be granted.

General Tire said 1,400m. lb. of oil-extended rubber were produced in USA in 1959 and a larger amount was being made this year. About 75% of that produced in 1959 was used in making tyre treads, the company added. In addition to its lower cost, the material was claimed to impart 18% longer tyre wear; 90% of all US tyres contain at least some high Mooney SBR-oil masterbatch.

Nine Year Battle

The patent decision and its sequel comes after a nine-year long battle of claims and appeals by General Tire. The final legal ruling was that while the inventors had not demonstrated a new process in adding oil to SBR, they had produced a novel and useful *composition of matter.*

In 1950, when the oil-extended process was offered to the Reconstruction Finance Corporation (who at the time produced all the SBR in USA), the president of General Tire quoted a reported price of $65m. RFC refused, and O'Neill arranged to carry on the process with the Polymer Corporation of Canada.

An article on General Tire's oil-extended patent appeared in RJIP, October 8, 541.

Duty Calculation

The formula for calculating the new Malayan rubber export duties which become effective on January 1 has been announced.

When the price of rubber is 60 cents per lb. or lower the duty will be a flat rate of 4% ad valorem. Between 60 and 80 cents the duty will be 0.18625 of the price less 8.775 cents. Between 80 cents and M$1 the duty will be 0.40 of the price less 25.75 cents.

When the price is above M$1 the formula is 0.25 of x^2 plus 3.375 of x plus 14.25 cents, where

$$x = \frac{\text{price} - 100}{10}$$

The duty will be calculated to the nearest $\frac{1}{8}$ of a cent.

New Unit at Billingham

TO MAKE 30,000 TONS PLASTICIZER ALCOHOLS

THE heavy organic chemicals division of I.C.I. is to increase its capacity for the manufacture of alcohols by the carbonylation of olefinic feedstocks. A fourth unit, with a capacity of 30,000 tons of plasticizer alcohols a year, is to be erected at Billingham, Co. Durham.

This extension is planned, the company says, not only to meet the requirements of the rapidly-expanding UK plasticizer industry, but also to enable I.C.I. to supply the increasing demands of overseas customers.

The company's range of plasticizer alcohols consists of iso-octanol, isodecanol, 'Alphanol' 79 and nonanol which, when esterified with phthalic anhydride, are used as plasticizers for PVC.

Development work is said to be proceeding to modify the processes used for these alcohols and, furthermore, the capacity of an existing unit producing normal butanol and isobutyl alocohol by the carbonylation of propylene will be increased.

These projects will together raise I.C.I.'s total carbonylation alcohols capacity to over 140,000 tons per year.

More Silicone Rubber Price Cuts

MIDLAND Silicones Ltd. announce the third price reduction within five months for Silastomer silicone rubbers. The reduction of 2s. per lb. lowers the price of the Silastomer 2452-2455 series of general purpose easy processing grades from 30s. to 28s. per lb.

At the same time these rubbers, which until now were development products, have been reclassified as regular grades.

Midland Silicones say that the price cuts, which follow those announced in the last four months for 16 other grades of MS silicone rubbers, have been made possible by the wide acceptance of the Silastomer 2452-2455 series by rubber processors and by industry at large; this in turn has enabled Midland Silicones to pass on the advantages of large-scale manufacture.

The main improvements which the Silastomer 2452-2455 silicone rubbers are claimed to embody over the older, established grades, are: (a) They have even better heat ageing characteristics; (b) they are more easily processed on the mill and calender and will extrude faster; (c) components made from these grades exhibit less batch-to-batch variation in their final physical properties; (d) mouldings, extrusions and calendered sheets have a superior surface finish; (e) they have lower compression set, higher tear strength and lower shrinkage on curing; (f) thick sections can be more easily fabricated; and (g) they possess greatly improved resistance to boiling water and steam.

Argentina has lifted the 8% sales tax from casein.

Start Made on Goodyear Ballabgarh

The corner-stone of the new Goodyear $12m. tyre and tube plant at Ballabgarh, India (20 miles south of New Delhi) was recently laid by the Indian Minister of Industries in the presence of Indian national, state and municipal officials, and Goodyear executives.

F. T. Magennis, president of Goodyear International Corp., said: 'This country's promising future indicates sound economic growth. Improved economic conditions and standards of living in India are being accompanied by increased vehicle registrations. This plant will fulfill the need for tyres these transportations advances are creating.'

When it goes on stream in 1961 this latest plant in the Goodyear worldwide organization — the company's 60th — will produce passenger, truck and farm tyres for replacement and original equipment markets throughout India and the Far East.

Colouring of Rubber and Plastics

PIGMENTATION WITH TITANIUM DIOXIDE

By J. B. DYKES, B.Sc., A.I.R.I. (British Titan Products Co. Ltd.)

STIMULATED by a growing public demand for lighter and brighter coloured decoration in items from household equipment to cars, manufacturers have turned increasingly to titanium dioxide to produce the delicate shades required. The superiority in hiding power of titanium dioxide over the older white pigments very often makes its use an economic necessity. Permanence of colour, non-toxicity and chemical stability are additional properties which make titanium dioxide technically superior to other pigments for many applications.

There are two main types of titanium dioxide available and a variety of grades of each type. These differ in certain properties and offer the user a wide range for selecting the most suitable grade for his purpose.

Types of Titanium Dioxide

Titanium dioxide exhibits three distinct crystalline types, Anatase, Rutile and Brookite, all of which occur naturally; naturally occurring titanium dioxide, however, is not of commercial interest as a pigment. All the pigmentary material available today is manufactured, mainly from ilmenite, a titaniferous ore, deposits of which are widely distributed throughout the world. Commercially, titanium dioxide is produced in the Rutile or Anatase form. The Rutile form has two main advantages over Anatase — in refractive index and crystal stability — and is rapidly replacing it in many applications.

Manufacture

The sulphuric acid process is the most extensively used method for the preparation of titanium pigments from ilmenite ore and the various stages of this process are as follows. The ilmenite ore, which has been dried and ground to a fine powder (1) is digested with concentrated sulphuric acid (2) a violent reaction results which yields a solid cake of mixed titanium and iron sulphates. The metallic sulphates are taken up into solution with water and dilute sulphuric acid, an addition of scrap iron then being made to reduce any ferric iron to ferrous. The crude solution is clarified (3) and the ferrous sulphate crystallized out (4). Filtration and concentration of the titanium solution follows (5), extreme precautions being taken to ensure that no insoluble material passes into the precipitation tank (6). Nuclei, which partly determine whether the resultant pigment shall have a Rutile or Anatase crystal structure, are added prior to the precipitation of the hydrous titanium dioxide. Extensive washing of the hydrous paste (7) is carried out before certain additions are made to promote the development of the required pigmentary properties. The washed precipitate is calcined (8) at about 1,000°C. in a rotary calciner, the temperature being controlled within 5°C. This part of the process is quite critical as it not only removes moisture but controls crystal growth which ensures that the full opacifying powers of the pigment are developed. Finally, the calcined pigment is dry ground (9) to break down any pigment agglomerates. The dry milled pigment can be packed in this form or passed through a wet treatment process (10) which allows for the pigment to be surface treated to enhance some particular property, *e.g.* texture or durability.

TiO_2 in Rubber and Plastics

Every type of plastic or rubber material can be pigmented with titanium dioxide, but not every grade of titanium dioxide is suitable for all plastics and rubbers. There are some fundamental differences between the various grades of titanium dioxide available and it is advisable to ensure that the correct grade and optimum amount are being used for any one particular application. Selection of the most suitable grade of pigment can sometimes be narrowed down by a general consideration of the two basic types of titanium dioxide, Rutile and Aanatase[1].

Rutile Pigments

Rutile type titanium dioxide has the highest tinctorial power of any known white pigment, being appreciably higher than Anatase (Table 1), and generally imparts good resistance to breakdown of organic material exposed to sunlight and weather, while at the same time maintaining colour stability.

TABLE 1
TINTING STRENGTHS OF WHITE PIGMENTS

Pigment	Tinting Strength
Tioxide R-HD ..	1690
R-CR.. ..	1600
R-SM ..	1500
A-LF	1300
A-HR.. ..	1250
Zinc Sulphide	780
60% Lithopone ..	500
30% Lithopone ..	300
Zinc Oxide	200

Anatase Pigments

Anatase titanium dioxide is not recommended for use in products exposed to weathering, as they generally exhibit severe 'chalking' under such conditions; it is mainly used where the development of a clean neutral white tone is desired.

There are many factors to be taken into consideration when selecting a white pigment and the technologist is advised to assess all of them before making a final selection.

Opacity

Refractive index and particle size are the two most important properties which influence opacity of white pigments. Specific gravity is also important, in so far as opacity is usually related to a given weight of pigment.

Titanium dioxide has the highest refractive index (Rutile 2.71, Anatase 2.55) and lowest specific gravity (Rutile 4.2, Anatase 3.9) of any white pigment, while its particle size is controlled during manufacture to limits which ensure that the average value closely approaches the theoretical optimum for maximum opacity (between 0.15 and 0.35 micron). The difference in refractive index between Rutile and Anatase is the main reason why Rutile has the higher opacity and, consequently, higher tinting strength (Table 1).

In a number of plastic materials, it is often very desirable to keep the loadings of filling or colouring material as low as possible to preserve their processing properties. High loadings of pigment can also lead to dispersion difficulties with resultant deterioration in surface finish and, in some cases, mechanical properties. Titanium dioxide, through its high tinting strength or hiding power

[1] *BTP Rutile grades have a prefix 'R' after Tioxide, while Anatase grades have a prefix 'A', e.g. Tioxide* R-HD *and Tioxide* A-HR.

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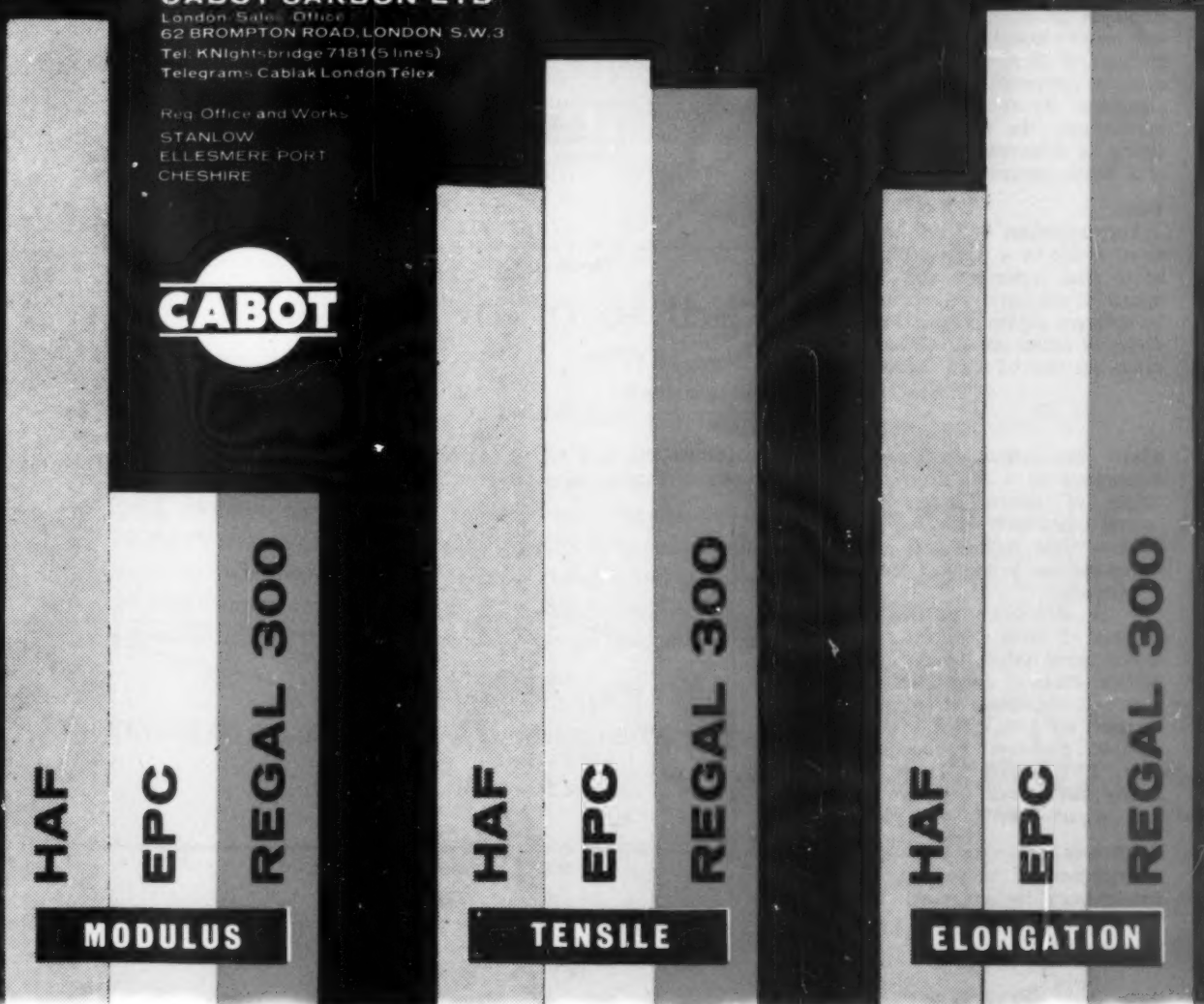

provides the best answers to these problems.

In Fig. 1 the contrast ratios of polythene pigmented with Tioxide A-HR and Tioxide R-HD are compared. Contrast ratios are a measure of opacity and are derived from the formula: —

$$CR = \frac{\%\text{white light reflection with black backing}}{\%\text{white light reflection with white backing}} \times 100$$

With the same loading, it is clear from Fig. 1 that a higher opacity is achieved with Tioxide R-HD than with Tioxide A-HR.

In other plastic materials, where

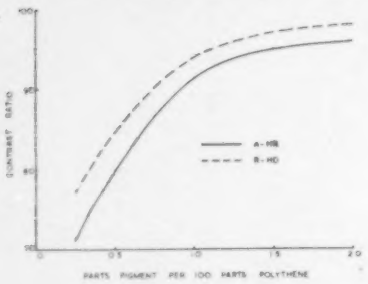

Figure 1

high loadings of pigment are employed for the production of white and pastel shades, appreciably lower loadings of titanium dioxide can be used as compared with other white pigments. As applies for all other applications, the greatest economic saving is achieved through the use of a Rutile pigment.

Tone

The undertone or shade imparted to an article by a white pigment can be of vital importance and a useful means of comparing tones imparted by different pigments is to determine values of colour index. Colour index values are derived from the formula:

$$CI = \frac{\%\text{Red light reflected} - \%\text{Blue light reflected}}{\%\text{Green light reflected}} \times 100$$

where the reflectance values are determined on a colourmeter. Zero values of colour index indicate neutral tones such as white, grey or black — while positive and negative values indicate yellow and blue tones respectively.

It is only with relatively high loadings of other pigments that the colour index value for the titanium dioxide stocks is approached. Table 2 records the values of colour index obtained on a range of loadings of Tioxide pigments in opaque and clear PVC bases. These figures clearly demonstrate the more neutral tone imparted by Anatase pigments.

Brightness

Brightness of rubber and plastic articles can be enhanced by the incorporation of titanium dioxide. Fig. 2 shows how the brightness of a natural rubber gum stock varies with loadings of several white pigments. Titanium dioxide develops the highest brightness of any white pigment at a considerably lower loading. Brightness is defined here as the percentage of white light reflected relative to magnesium oxide (Brightness = 100) and is determined using a colourmeter.

Light Fastness

Polymeric materials generally discolour on exposure to light, some at a faster rate and to a higher degree than others. Pigmentation can retard or mask colour changes in polymers and particularly in the case of titanium dioxide, the type and quantity can have a considerable effect on colour stability. Figs. 3 and 4 show how the colour stability of rigid PVC exposed outdoors can be affected by loading and type of titanium pigment used.

Durability

Surface chalking and crazing on outdoor exposure are well known phenomena of paint films and they also occur with rubber and plastic articles. Fig. 5 shows a photograph of the surfaces of a lightly loaded natural rubber compound pigmented with three different pigments after eight months exposure outdoors. The base stock contained no waxes or other protective agents and the pigment loadings employed were 35

TABLE 2
COLOUR INDICES OF PIGMENTED PVC

PVC Base	Pigment Loading Parts PHR	Tioxide A-HR	Tioxide A-LF	Tioxide R-HD	Tioxide R-CR
Clear	0.5	5.9	5.7	10.0	12.5
	0.75	5.0	3.7	9.3	10.4
	1.0	4.2	3.6	8.4	10.8
	1.5	2.9	3.5	8.7	10.7
	2.0	2.3	2.9	8.6	10.3
	5.0	2.2	2.2	8.8	8.9
	10.0	2.2	2.7	8.7	9.4
Opaque	0	13.7			
	0.5	12.0	12.5	13.1	13.7
	1.0	11.0	11.7	12.7	13.3
	2.0	8.5	8.1	11.7	12.9
	5.0	7.8	8.2	11.5	12.6
	10.0	7.7	7.6	11.3	12.0

TABLE 3
CHALK RATING OF RIGID PVC EXPOSED IN FLORIDA

Stabiliser	Pigment	Months Exposure 1 2 3 4 5 6 7 8 9 10 11 12
Tin	Tioxide A-HR	T Sl MH H ———
	A-LF	T—→Sl H———
	R-SM	
	R-HD	
	R-CR	
Lead	Tioxide A-HR	Sl MH H ———
	A-LF	T Sl M MH H ———
	R-SM	T ——→ M
	R-HD	T
	R-CR	

T = Trace Sl = Slight M = Medium H = Heavy

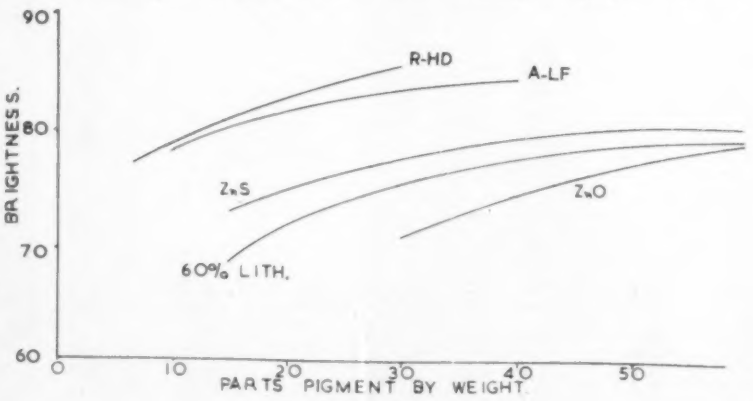

Figure 2

The frog in the well

knows nothing of the great ocean

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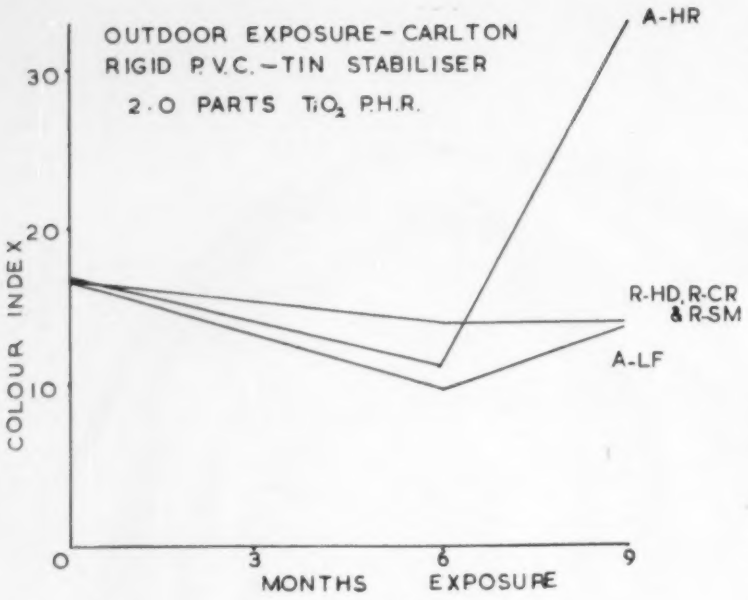


Figure 3

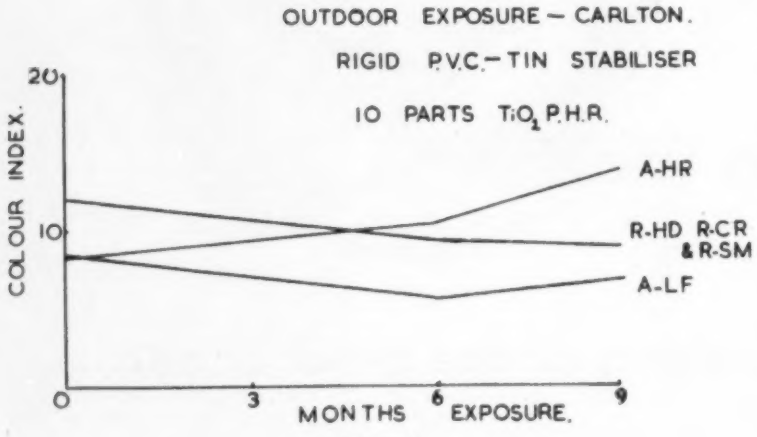


Figure 4

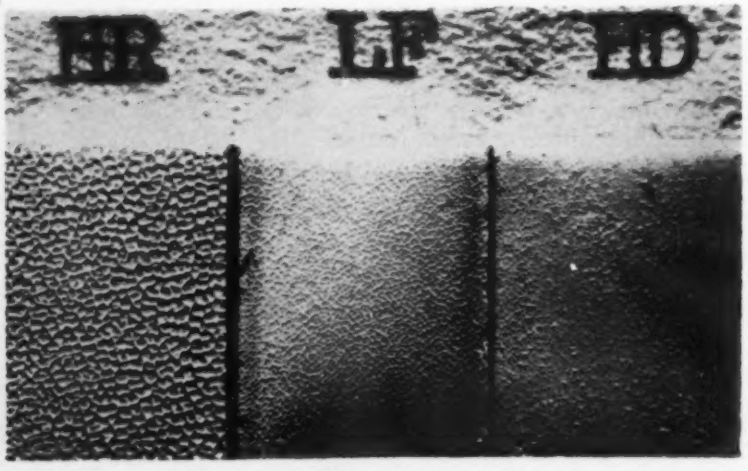


Figure 5

parts phr Tioxide A-HR, 33 parts Tioxide A-LF and 26 parts Tioxide R-HD. The Tioxide A-HR stock exhibited heavy chalking, the Tioxide A-LF stock moderate chalking and the Tioxide R-HD stock very slight chalking after this period of exposure. Chalk ratings were determined on two rigid PVC formulations pigmented with 10% of varying grades of titanium dioxide and the relative values are given in Table 3. The superiority of Rutile type pigments over Anatase pigments under these conditions is evident.

Chemical Stability

Another property of titanium dioxide which leads to its incorporation as the white pigment for rubber and plastic materials for specialized applications is its chemical stability. Titanium dioxide is the most stable white pigment known, being unaffected by acids and alkalis, except at high temperatures.

Dispersion

Good dispersion of titanium dioxide pigments in rubber or plastics can be achieved by using any of the machinery or methods traditional to these industries. The pigment may be added dry on a two roll mill or internal mixer, but in highly plasticized compounds, and in particular, plastisols, it is advisable to add the pigment as a paste with part of the plasticizer. Dry tumbling of the pigment with plastic granules is frequently carried out prior to extruding or injection moulding. Care has to be taken over selection of the resin granule size for this process; large granules may be satisfactory at low pigment additions, but result in poor dispersion at higher loadings. Resin in a very fine form, however, may not impart sufficient shear during dry tumbling to break up loose pigment aggregates, which are not sufficiently dispersed during subsequent processing. Where relatively high pigment loadings are required in plastics to be dry tumbled, better dispersion is obtained if the pigment is added as granules of master batch in the plastic resin.

Pigments differ in their ease of incorporation, the wet treated type of pigment being generally better than a dry ground material. However, provided reasonable precautions are taken, there is no reason why good dispersion of any pigmentary grade of titanium dioxide should not be obtained.

Summary

A general summary of the various properties of Tioxide pigments in

rubber and plastics is given in Table 4. Earlier it was stated that the selection of the most suitable grade of pigment could sometimes be narrowed down by considering the two basic types of titanium dioxide, Anatase and Rutile; it is evident from Table 4 that there are several grades of each type available varying somewhat in their properties. The variation is entirely due to modification of the end treatment applied to the pigment. A careful examination of each grade must therefore be carried out; possibly some small compromise must be made in one property or another, but the outstanding advantages to be gained by using titanium dioxide considerably outweigh any minor deficiencies. Extensive research and development work proceeds daily in an endeavour to produce the perfect white pigment based on titanium dioxide.

Acknowledgment

The author wishes to thank the directors of British Titan Products Co. Ltd. for permission to publish this paper.

TABLE 4
SUMMARY OF PROPERTIES OF TIOXIDE PIGMENTS

Property	Tioxide A-HR	A-LF	R-SM	R-HD	R-CR
Tinting Strength	FG	FG+	G	E	VG
Initial Colour	E	E	G	G	G
Brightness	G	G	VG	E	E
Colour Stability	P	G	G+	VG	E
Durability	P	FG	G	VG	E
Dispersion	G	VG	G	E	VG

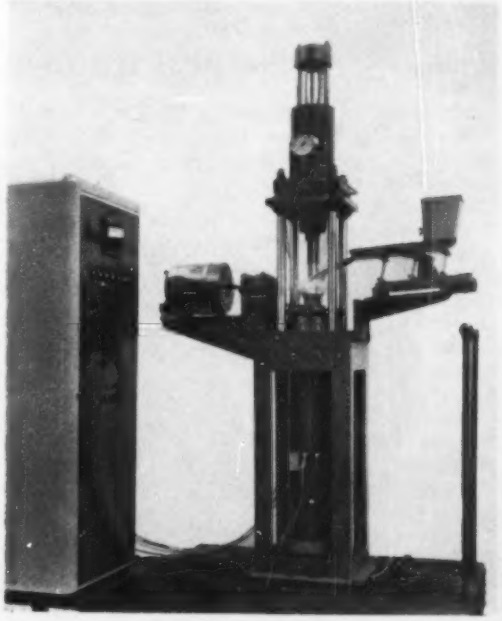
P = Poor G = Good E = Excellent FG = Fairly Good VG = Very Good

Extruder/Press for PTFE

THE problems of producing a reliable, stable and economic extruder press for handling PTFE have been the subject of a great deal of research in the last few years. A machine has recently become available which is claimed by the manufacturers, Jennings Engineering (Great Britain) Ltd., to offer the best results hitherto achieved with this type of machinery. Features of the new machine include hydraulic operation instead of pneumatic, giving greater thrust combined with economic power consumption, variable length sintering oven and multiple die assemblies, ensuring higher production rate for small dimension items.

The production of rods and heavy walled tubing from granular PTFE resembles conventional extrusion, but is, in fact, a combination of compacting and pressure sintering in a continuous process. A long vertical die tube is used, polymer is metered into it at the top and pushed down by a reciprocating ram. The polymer expands on passing through the sintering oven, setting up resistance to the ram and ensuring compression of the material before sintering. The sintered polymer then passes through the final section of the die tube where it cools and shrinks to its finished size.

The machine is fitted with a central control panel from which all mechanical, electrical and hydraulic elements can be individually regulated and operated in an automatic cycle, allowing the machine to work for long periods with the minimum of attention. When on the automatic cycle the correct sequence of ram movement, die indexing and material feed are ensured, and as both the time cycle and feed rate are controlled, the polymer flows at a constant rate. It is possible to modify both the feed rate and the time cycle during operation without disturbing the synchronized sequence of operation.



The new Jennings TRE-V hydraulic extruder for handling granular PTFE, showing the press, feed mechanism, sintering oven and control cabinet. The machine is mounted on a stand and, if necessary, a further sintering oven can be easily mounted below that shown

Seven More Taxes

Dr Goh Keng Swee, Singapore's Finance Minister, has announced seven new taxes in his budget statement to the Legislative Assembly. These include a business registration tax, under which the Government would levy registration fees ranging up to 1,000 Straits dollars per year in the case of a public limited company, and a stamp duty on import and export declarations, which would be similar to the Hong Kong levy whereby one Hong Kong dollar is charged on every import or export declaration form entered by traders.

Rates of assessment on rubber estates on the island will also be increased, bringing them roughly into line with those ruling in the Federation of Malaya; and a property tax will be introduced to replace the present local rating system. The latter tax will only affect rural areas, but rural industrial establishments are exempted.

Duraglass Reduced

Following the price reduction for glass rove in October, Turner Bros. Asbestos Co. Ltd. have now made further cuts in the prices of their 'Duraglass' glass-fibre materials.

These reductions effect both 'E' and alkali glass 'Duramat' chemically and mechanically bound glass mats, chopped rove, and a further reduction is also made to all qualities of glass rove. Reductions range from 2d. per lb. to 6d. per lb., depending on the material and quantity required.

The Commonwealth and Rubber

INSTITUTION OF THE RUBBER INDUSTRY'S ANNUAL DINNER

ILLNESS prevented Dr Erich Konrad from being present to receive the 1960 Colwyn medal at the Institution of the Rubber Industry's annual dinner, which was held at the Savoy last week. A letter from him was read out, in which he wrote that he wished to extend the honour to the former I.G. Farbenindustrie AG and Farbenfabriken Bayer, whose far-sightedness had made his work possible. Dr Konrad received the award for work on emulsion polymerization and the preparation of general purpose synthetics.

C. B. Copeman (right), chairman of Maclaren and Sons, publishers of *RJIP*, receiving the Hancock medal from George Martin, IRI council chairman

The Hancock medal was presented to C. B. Copeman, chairman of Maclaren and Sons Ltd., publishers of *RJIP*, by the IRI council chairman, George Martin, in the absence of the president, Sir John Dean, who was recovering from a serious operation. The council chairman said that Mr Copeman had given outstanding service to the industry and to the Institution since its inception. He was a founder member of the Institution and had been a member of the council through the years and had served on many committees.

Greatest Moment

In what he described as the greatest moment of his life C. B. Copeman said that one thing puzzled him — he didn't know what the outstanding services were. He owed the Institution far more than it owed him.

When he had joined *Rubber Journal* 55 years ago there had been many secrets in the industry. 'Now — as at this dinner — we are all the best of friends,' he said.

As two new overseas sections of the IRI have recently been founded, and more are contemplated, it was appropriate that the Commonwealth was so well represented at the dinner. Among many distinguished guests were the High Commissioners of Malaya, Ceylon, Rhodesia and Nyasaland, the senior trade commissioner for South Africa and the agent general for Ontario.

A review of the Canadian rubber industry was given by the principal speaker, J. S. P. Armstrong, agent general for Ontario. After tracing its development from the establishment of the first plant in 1854, he referred to Polymer Corporation's recently announced plans to set up plants in France and the UK. This was, he said, in order to protect its position in international markets.

Canadian Consumption

Mr Thompson stated that Canadian industry used about 60% natural rubber and 40% synthetic. Tyres and tubes accounted for 54% of the products, footwear for 12%. The overall rate of growth of the industry was 4% a year, and if this continued it would mean a total rubber consumption of about 275,000 tons annually by 1980.

'At present,' he said, 'the rubber industry in Canada cannot be said to be flourishing — chiefly due to the loss of export trade and rising costs of production. The industry has to rely mainly on the domestic market and is seriously handicapped by low priced imports from countries with a lower cost of living and production. Unlike Britain, Continental countries and the USA, Canada — for some

Continued on page 1054

Natural Rubber the Great Model

AN extract from Dr Erich Konrad's letter to the IRI, which was read out at the annual dinner is given below: —

'It was more than 30 years ago when we set out to explore a field the theoretical and practical fundamentals of which were rather modest in those days. It gives us great satisfaction that our efforts have led to large-scale synthetic rubber production all over the world, thus pushing forward technical progress almost everywhere. Owing to a mutual exchange of scientific knowledge and technical experience, I daresay that also the growth of the now so highly branched tree of plastics has profited from our work in synthetic rubber-like materials.

'I have always looked upon natural rubber as the great model substance which with respect to some properties might be surpassed, but hardly duplicated as regards the totality of its wonderful properties. It was not before the most recent past that the synthesis of "natural man-made rubber" was rendered possible mainly by the discovery of a new class of polymerization catalysts.

'Now elastomers, equally interesting both under scientific as well as technical aspects, and not at all following the building principle of natural rubber, are continually being found. I very much regret that I am no longer able to participate in this work, but I am glad to know that so many capable scientists and rubber technologists of the younger generation have already taken over in many countries.'

THE IRI ANNUAL DINNER

by Fred May

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Round the World

JAPANESE CRACKER — FRENCH NEOPRENE LINING — CZECH PRESS

A NEW plant in Japan is now producing ethylene. The cracking furnace at the heart of this plant contains a heating coil of nickel/chromium/iron alloy tubing. In producing ethylene, a feed stock naptha is preheated and enters the externally fired tube coil, where it is cracked at 650 to 760°C. to yield ethylene and by-products. The heating coil was made out of straight runs of alloy tubing, about 5in. diameter by 40ft. long. Each length of tubing is connected to its neighbour by a fairly close radial bend. In addition to its strength and oxidation resistance, the alloy tubing was chosen because it also possesses resistance to corrosion and good ductility.

Olefinic elastomers, in the solid or latex form, can be protected from the harmful influence of sunlight and atmoshperic ozone by the incorporation into the elastomer, at the end of the mixing cycle, of from 0.1 to 5% (preferably 1 to 2%) of a nickel xanthate, according to a French company, which has patented the discovery. The xanthate may be either alkyl-xanthate, alicyclic xanthate, aryl-xanthate, or aryl-alkyl xanthate. Titanium oxide, at least one microcrystalline wax, an amorphous paraffin and an anti-ozone substance chosen from dihpenyl-p-pheylenediamine, zinc mercaptobenzimidazolate and dinaphthyl-p-diphenylenediamine, may also be added to the elastomer.

Italian Synthesis

From Italy comes news that a number of new synthesis of carboxylic acid and esters from the chlorinated derivatives of allyl compounds and carbon monoxide catalyzed with nickel carbonyl have been described. These syntheses have been compared, on the one hand, with the reaction of dimerization of the chlorinated derivatives of allyl compounds and, on the other, with the carboxylation of acetylene to acrylic acid or acrylic esters. A scheme has been put forward in which the basic mechanism is considered to be the primary formation of a co-ordination compound derived from the reaction between nickel carbonyl and the chlorinated derivative.

Over the past 50 years, efforts have been made unsuccessfully to prepare, or at least obtain proof of, tetramethyl-cyclobutadiene. The French have, it now appears, succeeded in determining a complex of the relevant type, produced by transformation of nickel carbonyl with tetramethyl-dichlor-cyclobutene in solvents such as benzene, acetone or ether. The compound has been obtained in the form of a reddish-violet crystalline powder, soluble in water and some organic solvents. The complex is a true derivative of cyclobutadiene, the dimer of which was formed through thermal decomposition.

In the Middle East anti-corrosive measures are taken the moment equipment is put to use. For underground lines and tank bottoms, a coal tar base material is employed mixed with epoxy resin for internal coatings. One of the great advantages of this is that the material does not dissolve in crude oil. Tank bottoms are repaired by spraying them with a two-pack resin system and chopped glass fibre.

Rubber Bearing Pads

In France, considerable use is being made of neoprene linings in vats for washing abrasives. This is on account of their ability to withstand heat, chemicals and abrasion. The linings are 4mm. thick and take the place of a 15mm. coating of lead, which used to erode and need replacement in a period from six to 12 months. The neoprene linings, on the other hand, last for a minimum period of three years. Neoprene is also used by the French in making pigments, being the only lining material capable of resisting the abrupt changes of temperature from boiling to freezing required in this process, combined with agitation of the contents of the vats. The neoprene sheet is 6mm. thick. Large vats are being lined with neoprene sheet over a thin polyisobutylene base, and this is claimed to be superior to natural rubber because it withstands traces of organic solvent present in the vats. The polyisobutylene prevents the hydrochloric acid from diffusing through the neoprene to the surface of the tank. Finally, neoprene is used in sheet form to line conical floors, internal sidewalls and armatures, as well as sectional iron supports, of a large thickener for dealing with water from chemical slurries.

Rubber bearing pads for bridge girder support have been developed in France, and are constructed of neoprene sandwiched between steel plates. They have been found entirely satisfactory, and will withstand both vertical variations from dead to live loadings and creep or horizontal movements caused by the passing over them of rolling loads. Single pads under each girder adjust themselves and are usable with multiple span structures. The actual stresses have been proved not to attain the permissible stresses in these pads. Over 30,000ft. of French road bridges are now being carried by these pads.

Rubber pads to quieten rail noise have been adopted in Tokyo. Here, the underground railway is shallower than the London Underground, and the noise aroused protests. Rail pads, tried out, greatly improve conditions for both passengers and those living close to the line. The pads have been found very successful and have a life probably as long as that of the rails themselves.

A machine exhibited at the Czechoslovakian Fair at Brno was a press for vulcanizing rubber boots. This deals with both the pressing and vulcanizing of working boots having knee-length tops of rubber with textile lining. The machine's output is said to depend on the duration of vulcanizing, and is up to 50 pairs per eight-hour day.

Canadian Plant

Other Czechoslovakian machines for the rubber industry include a range of vulcanizers for repairing tyres up to 11.25 x 24, and a combination type machine designed for nine different operations in repairing footwear, eliminating tedious hand work and shortening repair time.

Polymer Corp.'s Canadian complex is said to be one of the world's most fully-integrated SBR plants. Light hydrocarbon feeds (previously refinery waste gases) are processed through various stages to produce the heavier hydrocarbon feeds necessary for the polymerization of the finished butyl and butadiene-styrene copolymer rubbers. In the butyl unit the isobutylene is polymerized with traces of isoprene in the presence, at low temperature, of a catalyst, to produce butyl rubbers. In the copolymer unit, the butadiene and styrene monomers from the other units are reacted in a

Continued on page 1054

CORRESPONDENCE

Promotion of Natural Rubber

Sir,

'Notes of the Week,' in your issue of December 3, gave well deserved praise to the International Synthetic Rubber Co. for their promotional work, mentioning particularly the touring display exhibition. This was, however, coupled with a criticism of promotional work, or what was felt to be the lack of it, for 'the natural product.'

This comment ignores the relative positions of NR and SR in the market. Generally speaking SR producers have, over the past few years, been trying to dispose of a surplus, while NR interests have been striving to remedy a deficiency. In our last annual report we stated: 'Due to world-wide pressure on supplies, all the NR produced in 1959 found a ready market and the price remained at a remunerative level throughout the year. This was all the more significant in that synthetic facilities, particularly in the United States, are reported to have operated below their maximum capacity.' In fact consumption of NR outstripped production, the deficit being made up from stocks.

A golden rule in promotion work is not to over-stimulate demand in times of scarcity. The NR producers have, under these conditions, concentrated on three main objectives: (1) To produce more NR more economically, primarily by increasing the yield of the tree and improving methods of cultivation. (2) To improve the quality of NR and increase its versatility. (3) To ensure that NR is utilized more effectively.

Though there is therefore at present no particular emphasis on general promotional work, no one can accuse the NR producers, on their record, of not carrying out publicity and promotional work enthusiastically where and when it was warranted. Since 1950 over two million people in many parts of the world have seen the Bureau's films, and the number of its distributed publications, mainly technical, amounts to several millions, providing valuable know-how for all branches of industry on the utilization of rubber and emphasizing new developments. In addition the Bureau has carried out extensive technical advertising and has put on many exhibitions and displays. Last month, for instance, we participated in the Public Works Exhibition at Olympia, and an NR display, produced cooperatively by the COI and the Bureau, is included in the current Commonwealth Touring Exhibition. The Bureau is also co-operating with sections of the manufacturing industry in various publicity projects.

As regards the future the NR industry, centred in Malaya, is not complacent—as its current $M12,000,000 a year research and development programme testifies — but it is confident that provided technical progress is maintained it can always hold its own in the face of synthetic competition.

Yours faithfully,

HUGH RODWAY.

Press Officer,
Natural Rubber Bureau.

*** Our remark was in no way intended as any reflection on the excellent work that the Natural Rubber Bureau have carried out in promoting NR. What we were criticizing was rather a matter of policy, an angle of approach. For example, Mr Rodway says that at present there is 'no particular emphasis on general promotional work.' We do not set ourselves out to be experts on modern marketing methods, but we should have thought that, even bearing in mind the market position, the advent of polydienes would warrant increased promotional activity. The effect that these so-called 'synthetic naturals' will have on the market is completely uncertain, but Shell's marketing of polyisoprene in USA does give an indication. Whereas other synthetics have been sold at a fixed price, figures produced by the Natural Rubber Bureau in USA show that Shell have moved the polyisoprene price with, or slightly ahead of, the natural rubber price. Whatever may be the technical virtues of these new rubbers compared with natural, they are being treated here as commercially equivalent. A new situation may therefore arise in this country when polydienes are marketed. Shell's Carrington polydiene plant will not come on stream until 1963, but it is probable that American polydienes will be sold in this country next year. We would have thought that these circumstances justified increased activity and possibly a fresh promotional approach — that it is better to advertise before the event. — Editor.*

Walking the Rubber

Sir,

Although I always enjoy the humour of Mulroy's cartoon I should think No. 509 (Nov. 5—'I think that I shall never see a poem lovely as a tree') excels them all. Never again will I be able to walk the rubber with a planter in the early hours without recalling this gem, and I shall probably get the reputation of bursting into laughter for no known reason. I would like an enlargement of this cartoon for hanging in my office, which, situated as it is in the middle of a rubber estate, provides added piquancy to the joke.

Yours faithfully,

ALAN H. RITCHIE.

Sungei Buloh,
Selangor,
Malaya.

THE COMMONWEALTH AND RUBBER

Continued from page 1050

reason — fails to give the same tariff protection against imports and this is detrimental to her home industry.'

The agent general referred to the possibility of the IRI establishing a branch in Canada. He said that certain organizations in other fields had broadened their services to include a number of the IRI's facilities. He understood that they were well supported by those in the industry. The IRI performed a useful function on a broad basis and provided valuable contacts, but he thought that 'where certain of your services duplicate those now offered by organizations already in the field, it may be unwise to compete with them unless they are disposed to withdraw and allow you to do the complete operation unhampered.'

Mr Thompson added that he was sure that the IRI would carefully review this delicate matter with all concerned in Canada before deciding on the best course of action.

During the evening it was announced that Dr L. Mullins, who was present at the dinner, had been appointed deputy director of the Natural Rubber Producers Research Association.

Round the World

Continued from page 1053

solution of soap to produce a butadiene styrene latex, which is coagulated, dried and packed for shipment.

Czechoslovakia has produced a precision bobbing machine operating with a crossed thread at extremely high speed, for reeling all chemical fibres. This machine is designed for all kinds of knitting and for workshops employed in weaving. A special arrangement coats the fibres with a preparatory emulsion. The construction of the machine allows it to function with from 12 to 16 needles. Bobbin speed is 218 to 1252 m/min. The bobbins have a bi-conical form. An adapter can be mounted on to the machine for gauging synthetic polyamide threads.

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VIEWS and REVIEWS

G. SAFFRAN, who is writing in *Plaste und Kautschuk* on 'Fundamental Problems of Latex Technology,' has now published part 3 in the November issue, pages 542-8. It is concerned with some of the biochemical phenomena in natural latex.

Latex Bacteria

The non-rubber constituents of natural latex, both inorganic and organic, present a good basis for the growth and development of bacteria and beneficent enzymes, he begins. (I am translating freely.) Analysis of the several types of concentrated latices shows a considerable variation especially in nitrogen content; obviously, evaporated latex of the Revertex type will contain more nitrogen than centrifuged latex, from which a large proportion of the non-rubber constituents have been separated.

From earlier work of this author, on the chemical nature of the non-rubber constituents, the existence was demonstrated of a wide range of amino acids, phospholipoids, such as lecithin, and many other 'biologically constructive compounds,' which can be used by bacteria or enzymes.

The work of J. le Bras and others on digestion with trypsin has added a lot to our knowledge of latex constitution and, incidentally, to our ability to make low-density, latex-foam rubber.

Only a few hours after tapping, lactic-acid- and proteolytic-bacilli are increasing rapidly, and this increase in bacterial activity can be considerably restrained by the addition of ammonia. The usual proportion of 0.4% to 0.8% NH_3 will stabilize the latex for years but, when the ammonia falls below 0.1%, the bacterial activity increases rapidly and the stability falls so much that coagulation occurs in a few days if the latex is kept at 33°C. At the same time the microscopic appearance changes too; the small particles disappear and their place is taken by lacto- and proteo-bacteria. Excellent microphotographs in this paper depict these changes in detail, and the techniques for preparing the slides are described carefully.

Most of the work was done on latex at 0.08% NH_3 and kept at 37°C. The changes in pH were followed at the same time, falling from just over nine to around eight in a week, while the NH_3 content fell from 0.08% to 0.01% or less.

These techniques, together with stability measurements, easily distinguished between Revertex (evaporated) and Z-latex (centrifuged). Revertex contained markedly more bacteria and became much less stable than centrifuged.

The ammonia was neutralized by the acid degradation products of the bacterial activity, and consequently the ammonia content is a good measure of bacterial action.

Bacteriacids

These results will be known or guessed at by most latex technologists; it is Saffran's further work which they will find most interesting.

He concludes, among other things, from this first part of his investigations that the bacterial degradation products are mainly carbonic and short-chain, fatty acids.

KOH number and zinc oxide stability are, of course, dependent on the acid content of the latex, and the volatile acids are of especial interest. There is here a well-argued discussion on the microbial formation of CO_2 by decarboxylation, along the lines suggested by van den Tempel. It is the lower molecular-weight, fatty acids which have the greatest influence on the conductivity and mechanical stability of latex; the long-chain fatty acids have other effects. Saffran discusses their respective roles at some length.

He reports results on various bactericidal preservatives for latex, including urotropin, sodium sulphite, and ammonium phenate, of which the last is by far the most effective and said to be advantageous in foam rubber production.

After a brief and rather inconclusive discussion of the formation in the latex of natural accelerators via choline and monoethanolamine, Saffran proceeds to consider the influence of enzymes on the stability of latex and gives graphs and tables of data showing the effects of a number of them, including trypsin, pepsin, diastase, insulin, on MST figures, and compares them with microphotographs. He comes to the conclusion that there is considerable scope for work with enzymes in processes for the resin-reinforcement of latex rubbers.

The Moose Foam Cocoon

Everyone who has learned to drive a car will remember the feeling in the early days — though it never entirely leaves one — that to be able to stop at will is more important than to be able to start or to keep going. Space travel seems to have reached just such a stage: we can get up, getting down again is the difficulty.

According to *I/EC* for November 1960, page 33A, the General Electric's Missile and Space Vehicle Dept. has made a contribution to the solution of the problem along the lines of foamed polyurethane. In the case of an emergency 'up there' with the vehicle becoming disabled, the passengers spin themselves cocoons, life jackets, of urethane foam, during their free fall and so protect themselves against the heat arising from atmospheric friction and against the bump of the landing.

The system is called MOOSE, which stands for 'Man Out Of Space Easiest,' and the constructional labour of evolving such a name is matched only by the industry and toil of the intrepid astronaut foaming away out there in space. True, he will have everything to hand: his tanks of liquid raw materials, his mixer and foam generator, his plastic bag, parachute, auxiliary rockets, radio beacon, antennae, straps, cords, flares, and so on. All he has to do is, I quote, 'To deorbit. he takes a retrorocket package, visually orients himself to earth, and measures the altitude and flight direction' which 'tells him the proper direction to aim and fire the hand-rocket to achieve re-entry.'

Now follows the process that all foam rubber technologists are waiting to learn about. 'He then inflates the plastic bag and turns on the foam generator. The quick-setting material fills the space between the immediate clothing and the outer bag.' The nose portion of the 'conisphere shape' has a dense (50lb. per cu. ft.)

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **F. C. JENNINGS**

foam cover about an inch thick. The outer afterbody foam coating is much less dense (about 3lb. per cu. ft.) and a very low density foam (1lb. per cu. ft.) fills in the rest of the space between man and shell, much like the white of an egg surrounds the yolk.

I am sorry I cannot tell the foam technologist how this is done. I do not know and the article does not say. But one of its remarks is worth repeating: 'Catastrophic accidents are almost sure to occur during early space exploration.'

Horse Blankets

Down to earth again, *I/EC* for November 1960 records that Sunny Jim Fitzsimmons, an expert horse trainer, has been experimenting with urethane foam in horse blankets. 'No point,' he says, in his 86th year, 'of hanging on to the old way of doing things, just because it is the old way.' The new material is 'durable and all-but-weightless, unaffected by acids, alcohols, and liniments, that can be washed and reused again and again.' Indeed the main obstacle would appear to be one of pronunciation. 'Grooms may never learn to call it polyurethane.'

Sound Absorption

Kunstoffe for November 1960 (Vol. 50, No. 11) contains a paper by Dr H. Thurn entitled 'The Influence of Various Compounding Materials on the Sound-Absorbing Properties of Acoustic Insulations,' on pp. 606-612. Deciding on the best base polymer, filler, temperature, frequency, and so on, for sound damping is a very complicated matter. In this investigation, the damping properties were measured, using a deflection oscillograph, at about 200 frequency as a function of the temperature. The results showed that the temperature of the damping maximum at the same frequency increased with increasing thickness as well as with increasing filler content. Compounding materials with a platelike structure, such as graphite or mica, produced a greater increase in damping than materials such as carbon black. The effect seems to be caused by the frictional attenuation occurring between adjacent plates or strata.

Pound Absorption

There are times when it pays to use the same kind of approach — the scientific — to everyday problems such as running the office. However much the technical man may deplore it, the efficiency of a business organization is measured ultimately not in ergs or dynes or even percentages but in £sd. Cost, I shall go on saying, must always be one of the factors in our technical equations. I intend to make no apology for bringing up this matter so frequently.

I want to refer to a reporter's contribution to the *Daily Telegraph* a few weeks ago. He was writing with reference to a lecture given by Lord Courtown, head of office administration at Imperial Chemical Industries, who had said that he had calculated that the cost of a simple memo was 1s. 5d. plus the cost of the dictator's time.

That is not an overestimate; it could be much more. There is evidence that the present-day cost of a full letter is about 4s. Clearly, the accuracy of these calculations depends on the basic assumptions, such as office rent, typist's salary, and the extent to which the typist is employed throughout the day — frequently she can be busy at the beginning of the morning and again in the late afternoon but idle for long periods in the middle of the day. If such alternating periods of peak load and idle time could be levelled out — as they would be in the industrial work of a factory — there would be a gain all round, to the company in greater efficiency and to the office staff in happier conditions.

There seems to have been a big increase in the amount of writing done in the last few years. The number of typists in Government offices has risen from just over 13,000 in 1939 to nearly 27,000 this year, and their salaries from £1,800,000 to some £13m. The total number of typists in all offices in England and Wales has increased in the last 20 years from 212,000 to 496,000.

Answering On The Letter

Lord Courtown suggested that letters needing only a simple answer could be returned at once with it written on them. This would indeed be refreshing to see. So often, one of the two opposite lines of action is taken: the replier makes a meal of what should be only a snack, or he delays replying in order to deal with something more important.

Of course, it might be that in some organizations a new office etiquette would need to be learned, both to avoid taking offence at the receipt of such a summary answer and to avoid giving offence by the careless wording of a handwritten comment.

In the large organization, an occasional, headquarters' directive on such matters, aimed at reducing unnecessary office costs, would be worth considering. Obviously, one can be penny-wise and pound-foolish and can spoil the ship for a ha'p'orth of tar, but there are savings to be made by giving a little thought. A brief course of training for all junior executives could save some organizations some money; it could include training in dictating, the efficient utilization of a secretary, duplicating, photo-copying, handling the telephone. Attention might also be paid to the thoughtless waste of stationery and to periodic reviews of forms and systems.

Oxidation of Polythene

Polythene can be oxidized by air under the influence of heat and light; at temperatures over 120°C. the reaction is quite rapid. In practice, the oxidation may be brought about by the heat of processing or by the action of sunlight on polythene film. Antioxidants are available but they seem to lose their effect after a time.

L. Zakrewski, L. Jacque, and P. Dubois report their investigations on 'The Phenomena of Oxidation of the High and Low Density Polythenes During Processing' in *Industrie des Plastiques Modernes* for August-September 1960. Vol. 12. No. 7. Pp. 49-52. Oxidation was effected by hot mixing and hot calendering at 175°C. and the degree of oxidation was measured by infra-red spectroscopy.

The oxidation was found to increase with time of working, the method being accurate enough to be able to distinguish stabilized from non-stabilized materials.

The authors claim that their method (based on estimating the C=O groups) is more accurate, because it is more direct than that of Myer *(Ind. Eng. Chem.* 1952). It has enabled them to calculate and to publish for the first time the coefficient of extinction of the group C=O in the spectra of polythene (it is 675).

CHARLES JENNINGS

MEN *and* MATTERS

A Review of People and Events

by Peter Richards

NOW that the 'bulge' is moving out of education into industry, it is vitally important that companies should not waste this extra talent. Dunlop are obviously making sure they don't. Education awards totalling over £600 were made to 77 Fort Dunlop employees at a ceremony in the factory council chamber this week. They were presented by Mrs D. B. Collett, wife of the Dunlop's director of production.

Dunlop encourages study in both vocational and non-vocational subjects, by day-release classes, by night school or in the factory. In almost all cases the company itself pays the tuition fees. Awards are made for successful completion of a course of study and range from 30s. for a pass in a single ordinary level GCE subject, to £40 for all the stages of a B.Sc. degree.

Present Successes

The present examination successes consist of ordinary and higher national certificates, City and Guilds Certificates, Associateship of the Institution of the Rubber Industry, and a number of certificates in industrial administration, workshop supervision and work study. The list also includes various endorsements for men going on to further qualifications, such as A.M.I.Mech.E. The award winners include apprentices, foremen, draughtsmen and laboratory and other technicians.

At the same ceremony, Mrs Collett presented certificates to 35 men on the successful completion of their five years' apprenticeship. Five of these received prizes for exceptional work in the apprentice school.

£50 Christmas Box

Two of Greengate and Irwell's long service employees got a very nice Christmas box on Wednesday December 21. They were presented with cheques for £50 — £1 for each of their 50 years of service.

The employees, T. Holland (Greengate Works) and Mrs E. Woodward (Irwell Works) were given the cheques by the chairman, J. Frankenburg, following a lunch which they attended, together with the company's pensioners.

Dick Aisher

I am very sorry to hear of the recent death of Richard Harry Aisher, director of Marley Tile (Holding) Co. Ltd., and second son of the company's founder. 'Mr Dick' — as he was popularly known — died in a London hospital. He leaves a widow, son and two daughters, and among the bereaved are his father and two brothers.

He joined the family business at the age of 16, when it was still concerned with house building and had only just started making roof tiles. Together with his father and two brothers he played a major part in the development of the business and although his interests were concerned with all the group's activities, he devoted most of his time to selling.

The success of the sales side of the Marley Companies in the UK and all over the world were largely due to him.

Sydney Oxon Retires

Sydney Oxon of Goodyear, one of the best-known tyre personalities in the business, is retiring at the end of this month. He has served his firm

in various important capacities for more than 44 years, and a cocktail party has been held in his honour at the May Fair Hotel.

During this party, M. S. Meyer (Goodyear's managing director), presented a gold watch to Mr Oxon, on the right in my picture, from his many friends within the company.

Sydney joined Goodyear as a solid tyre salesman in 1916. In 1919 he was appointed assistant to the managing director and in May 1920 became sales manager.

After various other steps up the ladder he was appointed manager, manufacturers' sales division in 1946, which he held until he took up the assignment of O. E. Account Executive in 1947.

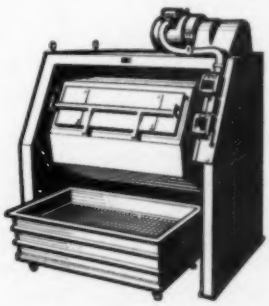
New Symbols

Bonded Fibre Fabric recently introduced a smart new house mark. Now the company's two ranges of bonded fabrics will be identified by

Both the child's Christmas stocking and the parent's pocket would have to be pretty big to afford this beautiful half-scale replica of the Triumph TR3, manufactured throughout from glass reinforced Bakelite polyester resin. Cost: £48 7s. 6d. Made by Coventry Laminates, it will accommodate two children and has a 'dual pedal' drive

De-flash with 'Drikold'

With 'Drikold' and the Columbian International sub-zero tumbler you can raise production by de-flashing small rubber components quickly and efficiently. 'Drikold'—I.C.I. solid carbon dioxide—freezes the components and makes the flashes brittle, so that they break off as the drum of the tumbler rotates. Many mouldings—even complicated ones—can be de-flashed in this way. But if you're in any doubt, I.C.I. Technical Service staff will de-flash sample batches and advise you on your problems.



Sub-zero tumblers are available from Columbian International (Great Britain) Ltd., 116 Cannon Street, London E.C.4.

DK.333

Imperial Chemical Industries Ltd., London, S.W.1

new symbols incorporating their registered trade marks, Solena and Viscotex.

They will be used, in conjunction with the house mark, on all literature relating to the respective materials. The Solena symbol will also be featured in a new advertising campaign in the UK clothing trade press, starting in January.

John Capey Retires

John B. Capey, managing director of Steele and Cowlishaw Ltd., retires at the end of this year. He will be succeeded by J. A. Harley, who is at present his deputy.

Mr Capey, who is 67, joined the company when it was formed in 1924

J. B. CAPEY

J. A. HARLEY

and he was, in fact, the only employee apart from the two founders. He became accountant and then director and general manager in 1945. When the company joined the Baker Perkins group two years ago he was made managing director.

During Mr Capey's 36 years with Steele and Cowlishaw, he has seen it grow into one of the leading firms in the manufacture of mixing and other machinery, and has been closely associated with engineering developments in this field. On December 30, Mr Capey and his wife will leave for a four month's trip to New Zealand, Australia, Canada and USA, where he will visit customers and Baker Perkins offices and factories.

J. A. Harley is a Canadian who held executive positions with Baker Perkins companies in USA and Canada before taking up his present appointment in the UK.

Foam Prices by Computer

'How expensive is a piece of plastic foam?' seems to have as many answers as 'How long is a piece of string?' At least Kay Brothers have found it so, since their price list takes into account 14 different grades as well as limitless variations of size.

They have chosen a Ferranti Pegasus computer to do the list and the problem they set it was to work out individual prices for their expanded polyurethane in 12 different thicknesses, various grades and in any size up to 72in. by 36. The computer turned this one over for less than two hours — the problem would have taken several months if done by more conventional means — and came up with a list of nearly 125,000 prices. So the company can now answer customers' queries on prices speedily, simply by turning up the required figure.

The work was programmed by Kay's head chemist, Dr D. F. Rushman, whose knowledge of computers dates back to his days with Philips Electrical Ltd. Under his direction the computer was fed with the necessary data and the answers emerged at the rate of 200 to 300 characters a second in the form of punched tape. This tape then went through a teleprinter to produce the printed price list, complete with headings.

BHC Managing Director

Mr C. E. Evans has been appointed managing director of British Hydrocarbon Chemicals which is jointly owned by the British Petroleum Co. and the Distillers Co.

Mr M. A. L. Banks, Mr A. F. McDonald and Mr R. B. Southall have been appointed to the board.

* * *

E. R. Griffiths has been appointed deputy secretary of Monsanto Chemicals Ltd. Mr Griffiths joined Monsanto in 1956 as assistant secretary. A solicitor, he had previously been head of the legal section of Leicester County Council.

* * *

Mr J. A. Downes has been appointed chairman and managing director of Bertam Consolidated Rubber Company in place of the late Mr C. F. Stilwell. Mr J. A. Budd has been appointed a director.

* * *

Mr T. E. H. Birley, deputy overseas manager of British Insulated Callender's Cables, has retired after 40 years with the company.

* * *

Mr C. H. Wright has resigned from the board of Sungei Bahru Rubber Estates.

Question Corner — 149

(Second Series)

474. What special precautions should be taken when coating aluminium foil and Cellophane with polythene?

(Answer next week)

Answer to Question Corner — 148

473. The properties required from a good antioxidant for polythene are in some ways similar to those required for rubber, but these have to withstand more stringent conditions. A summary of the properties required is given below.

(a) They must not discolour during processing nor when exposed to service conditions.

(b) They must be capable of inhibiting oxidation under all conditions of storage, processing and service.

(c) They must be non-volatile.

(d) They must not be extractable by water.

(e) They must be non-blooming — that is not slowly migrate to the surface.

(f) They must not 'bleed.'

(g) They must be non-toxic.

(h) They must be odourless.

(i) They must not adversely affect the properties of the resin when in use.

Carbon black has proved most effective for protecting polythene from oxidation but its use is, of course, limited to dark coloured products. Other non-colouring antioxidants have been developed which may be used with translucent and coloured products.

(Another question next week)

Polly Ester Says . . .

'Ionic exchange — two Greeks swopping Christmas presents'

Deane's Underwater Salvage Apparatus

If your firm is losing valuable solvent by allowing it to escape to atmosphere, it's time you or someone with your sense of responsibility suggested solvent recovery by Sutcliffe Speakman. They can tell you how to recover solvent – water-miscible or otherwise – at a profit. If it can't be done *at a profit*, they will say so. There are more pieces-of-eight in this idea than you may realise.

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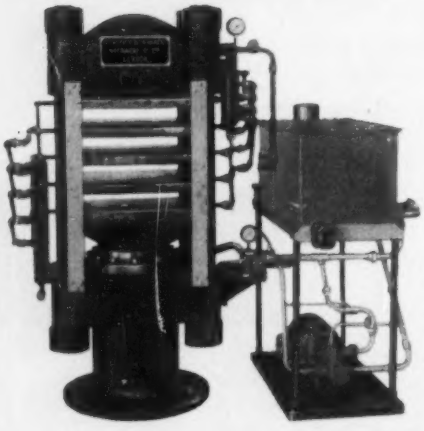
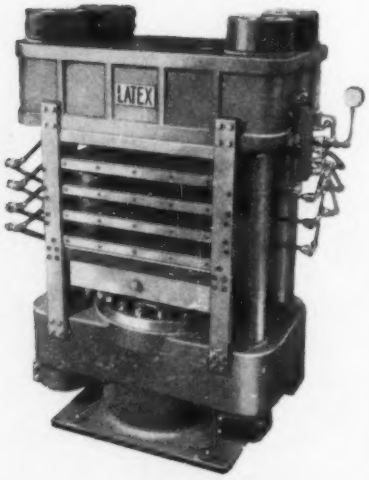


600-ton Press with Pump



1000-ton Press

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London Office: 4 CLEMENTS INN, W.C.2
Telephone: Chancery 2401/2 *Telegrams: Plastrub, Estrand, London*

Floating Covers for Expansion Tanks

RUBBERIZED NYLON FABRIC SOLVES PROBLEM

CORROSION control on pressurizing equipment for hot water heating installations has in the past been a difficult problem. Open spill tanks allow the water to absorb excess oxygen from the atmosphere, leading in some cases to severe corrosion. The use of a nitrogen blanket in a sealed tank assists the corrosion problem but is reported to lead to bacterial growth which can cause damage to sensitive controlling instruments, particularly valve facings and seatings.

Airtight Bellows

Pressurisation Ltd., in conjunction with Fothergill and Harvey Ltd. and P. Frankenstein and Sons (Manchester) Ltd., have now developed a system which has functional and economic advantages. This consists of a floating cover to which is fitted an airtight bellows securely attached at the top of the spill tank. The cover floats on the water as the level fluctuates and all contact with the atmosphere is prevented. Maximum impermeability and flexural strengths, together with high atmospheric resistance and long life were the prime requisites of the bellows fabric and a nylon fabric coated on both sides with neoprene has been found satisfactory. Accelerated tests of a bellows have shown that after a simulated life of 30 years the fabric was undamaged and still completely impermeable.

WELDING THERMOPLASTICS

Owing to the increasing use of thermoplastics in practically every industry, the Institute of Welding, 54 Princes Gate, S.W.7, is organizing a short course which has been planned to cover the basic materials and their properties, the welding processes and the principles of good design for welding.

This course will take place on January 30 and 31 1961, and is organized with the assistance of the Joint Committee on the Welding of Thermoplastics, which is sponsored by the Plastics Institute, the British Plastics Federation and the Institute of Welding. The fee for participation is £11, with a reduced fee of £8 for members of the Institute of Welding and the employees of Industrial Corporate Members.

Efficient Structures

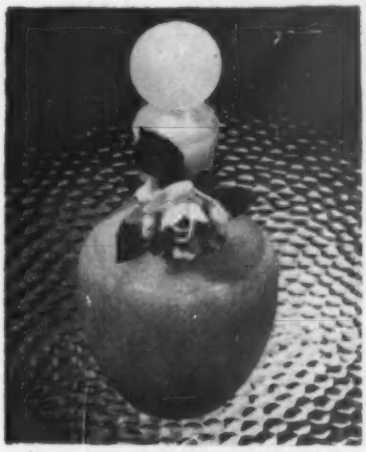
The main purpose of the course is that designers may be provided with the necessary information for the design of efficient structures in thermoplastics. Lectures will be given on materials, considerations at the drawing board stage, and on designing for welding in rigid PVC, flexible PVC and polythene.

The neoprene-coated nylon bellows is shown here in position prior to fitting in the spill tank

MOULDED CARAFE

Two blow mouldings and an injection moulding make up this bath salts carafe now being marketed throughout the UK.

Made of polythene, the carafe is manufactured by Kingston Mould-



ings Ltd. of Bognor Regis, from moulds designed by Baker Perkins Granbull Ltd. of Kingston-on-Thames. The stopper and carafe are separately blow moulded. The carafe has an integrally moulded spike to receive the rose which is an injection moulding in two colours; rose perfume has been added to the injection moulding ingredients so that it is permanently scented.

The blow moulding is carried out on a Baker Perkins Granbull 'Autoblow' unit attached to an extruder.

Zagreb Fair

The Board of Trade, through their publicity and overseas fairs branch, has made arrangements for the British section of the Zagreb Autumn Fair in September 1961.

Eight thousand sq. ft. of pavilion space and 3,000 sq. ft. of outdoor space have been reserved provisionally. Yugoslavia is a growing market: UK exports to the country amounted to £11,500,000 in the first nine months of this year.

Information about sites in the British section can be obtained from the Board of Trade or from the official agents, Empson and Turner Ltd., Thorn House, Upper St. Martin's Lane, W.C.2.

Butyl Acrylate

Dow Chemical Co. has reduced the price of its normal butyl acrylate monomer by 5 cents a lb. The new price is 35 cents a lb. freight prepaid. The company said the lower price should 'stimulate research and development work with the monomer.'

NATURAL
AND SYNTHETIC
LATEX COMPOUNDS

PRE-VULCANISED
LATEX

RECLAIM DISPERSIONS

COLOUR DISPERSIONS

VULCANISING DISPERSIONS

RL

RUBBER LATEX LIMITED

Harling Road, Wythenshawe, Manchester.

Telephone: Wythenshawe 3226/7/8. Telegrams: Compounds, Manchester.

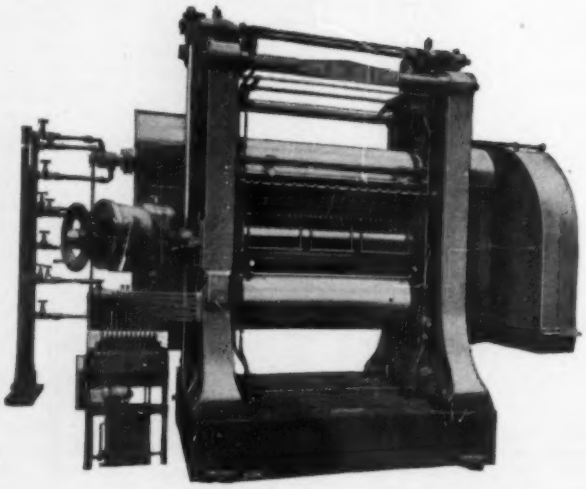
RL53

London Office: St. Dunstan's House, Idol Lane, London E.C.3. Telephone Mansion House 1005.

JOSEPH ROBINSON & Co. Ltd.

SPRINGFIELD LANE IRONWORKS, SALFORD 3, LANCS.

Tel.: BLA 1866/7 Grams.: OPAL M/c



24" dia. x 68" face 3-ROLL EVEN and FRICTION SPEED RUBBER CALENDER, with Patent Nip Feed Guard, Circular Lubricating System from individually driven 12-point Forced Feed Lubricator with Self Filling Pumps. Mechanically Operated Elevating Unit for top and bottom Rolls. Variable Speed Drive to suit any requirement.

News from South Africa

PROBLEM OF LIMITED MARKET

SOUTH AFRICAN manufacturers of a wide range of rubber products say that their competitive position in relation to similar imported lines is handicapped by the limited size of the South African market. They say that European manufacturers can produce for so large a domestic market that they can export at very low prices, compared with those which are economic for the South African manufacturer. A good article was generally made in South Africa, they added, but presentation was rarely up to oversea standards. European and American manufacturers were generally using more up-to-date plant and techniques than were usual in South Africa.

The Hi-Ho Vulcanizing Works, Mooi Street, Johannesburg, state that their new tyre retreading mould is not only the largest in Africa but the only one of its type used anywhere in the world. It is designed to retread the large 33.5 x 33 tyres with a diameter of 7ft. 6in. fitted on the earth-moving vehicles now in large use in South Africa. Previously replacements of the worn tyres cost up to £1,800 each. It is said they can now be retreaded at about 45% the cost of a new tyre. This 23-ton mould, made in Denmark, cost about £30,000.

Kitchen Range

EFI Products (Pty.) Ltd., P.O. Box 163, Pinetown, Natal, which are associated with the German firm of Erich Ficker, are making a new range of plastic products for kitchen use, such as an egg boiler which holds four eggs. It is made of polypropylene that is resistant to boiling water; tomato knives, jelly and pudding moulds, icing syringe, various types of nozzles, measuring beaker, orange squeezer and pastry cutters are other members of this new range.

Plastic and Metal Industries (Pty.) Ltd., P.O. Box 1821, Johannesburg, are also producing a large number of products for the kitchen. Waste baskets, tissue dispensers, jugs, trays and food covers are being produced.

Synthetic Development

The Synthetic Rubber Development Co., of South Africa (Pty.) Ltd., has been formed by the Government - sponsored Industrial Development Corporation, Ltd., to investigate the manufacture of synthetic rubber in South Africa. The initial capital investment is about £20,000 and if the results are encouraging there will be no delay in the promotion of a local company to make synthetic rubber. The South African consumption of natural and synthetic rubber is about 40,000 tons a year *(RJIP* December 17, 1006).

Cheaper Propylene Glycol

Price reductions of £5 a ton in the price of propylene glycol have been announced by I.C.I. and Shell. They will be effective from January 1 1961.

Propylene glycol is becoming an increasingly important industrial chemical and has many applications including the manufacture of polyester resins.

Australia's Rubber Roads

IN the past year more rubber surface dressings have been laid in Australia than ever before, according to 'Rubber in Roads Bulletin, No. 15,' published by the Natural Rubber Bureau. This is significant, the Bureau comments, because nowhere has the rubberized road been given a more thorough testing under difficult conditions of climate and terrain than in Australia.

The Bulletin quotes at length from a report by Mr J. Mathieson, M.C.E., M.I.E.(Aust.), C.E., M.A.P.I., chief engineer of the Victorian Country Roads Board.

'Past experience,' Mr Mathieson states, 'appears to have proved that the addition of rubber to bitumen in sprayed seal coats is an advantage when the surface to be treated is badly cracked, the increased "elasticity" of the bitumen apparently providing more tolerance to movement in the pavement, and, following this, five miles of cement stabilized sand pavement on the Hume Highway near Creighton's Creek, south of Euroa, have been sealed with bitumen in which was incorporated 2% of rubber powder.'

After giving details of the pavement condition and the method of work, he added: 'It was particularly noticeable that the binder was more "sticky" than usual, and its adhesion to the stones was much better than on the control section which had no rubber in the binder. . . .'

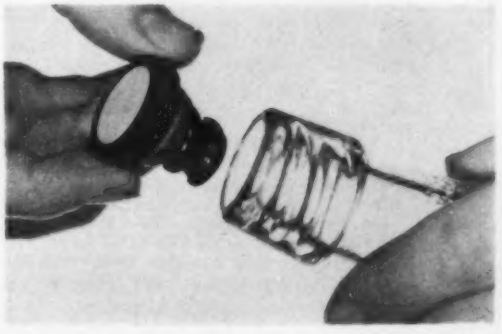
'As the result of this experience, cement stabilized sand pavements constructed during April and June 1959 totalling approximately five miles, have been sealed with bitumen in which was incorporated 2% of rubber powder.'

Mr C. C. Perrin, A.M.I.E.(Aust.), M.S.E., C.R.B., also of the Victorian Country Roads Board commented: 'There is evidence to suggest that the addition of rubber to the bitumen increases its softening point, its resistance to cracking in low temperatures, its elasticity and ductility which appears to improve its tolerance to expansion and contraction, its resistance to impact, and in certain circumstances its qualities of adhesion. . . .'

'The use of rubber appears to be of advantage when sprayed work has to be carried out under conditions when proper control of traffic on busy roads is difficult to achieve. . . .'

Mr Perrin went on to describe a test carried out in 1959 on the busy Hume Highway, near Tallarook. The work was done in cold weather and the aggregate was rounded river gravel, a material which, he said, it has always been difficult to achieve complete success with on heavily trafficked roads.

He added: 'The rubberized work is now in very good condition, whereas considerable stripping of the stone has taken place on the adjacent sections on which normal bitumen was used.'



Beer bottle stoppers are now being moulded in Rigidex high density polythene and are expected to have a much longer service life than ordinary stoppers. The moulders are Seal-Tex (Stoppers) Ltd., Spring Lane, London, S.E.25

PATENT SPECIFICATIONS

The following information is prepared from published Patent Specifications by permission of the Controller of H.M. Stationery Office. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, W.C.2, at 3s. 6d. per copy (including postage).

Radiation Resistant Elastomers

No. 853,219. Goodyear Tire and Rubber Co. Ltd. Application and Filed, April 7 1959. Application in USA, May 2 1958. Published, November 2 1960.

The radiation resistance of inflated rubber articles such as tyres and other load bearing devices is largely dependent on the resistance of the organic cord or textile reinforcing members contained therein. Degradation of these reinforcements can be caused largely by the formation of oxidizing radicals or chemically active agents, for example ozone, produced by the ionizing effects of the incident radiation on gases contained in the body of the article.

The removal of these gases, and their replacement by an inert gas greatly reduces the formation of chemically active agents likely to cause degradation of the fabric reinforcement of the article. This is achieved by inflating the tyre or article with an inert gas such as nitrogen, diffusion of the gas in to the body of the article removing the gases previously contained therein.

Styrene Methacrylate Copolymers

No. 852,239. Dow Chemical Co. Ltd. Application and Filed, January 25 1959. Published, November 2 1960.

An improved process for the production of copolymers of styrene and methyl methacrylate which are characterized by a high degree of molecular homogeneity and uniformity. This consists of heating at a constant temperature a homogeneous liquid reaction mixture comprising (a) a monomeric portion consisting of styrene and methyl methacrylate in a substantially constant proportion and (b) the copolymer product of copolymerization of the monomeric portion. The monomeric portion is copolymerized in this mixture keeping the relative proportions of the two constituents constant by adding (a) as needed, and intimately mixing the added constituents in the reaction zone. The essential requirements are (1) homogeneity of the liquid polymerization mixture, (2) constancy of composition of that mixture, and (3) constancy of polymerization condition.

Polyurethane Lacquers

No. 853,384. I.C.I. Ltd. Application, July 1 1957. Filed, October 1 1958. Published, November 3 1960.

The application of protective or decorative coatings to rubber and other materials, consisting of polyurethanes formed by interaction of polyesters, polyesteramides and polyisocyanates has hitherto suffered from disadvantages. These include premature curing or interaction of the coating components, undesirable use of organic solvents including effect on adjacent layers, or insufficient adhesion of the cured coating to the substrate.

These disadvantages can be minimized by the use of certain aqueous dispersions of the polyester or amide components. This dispersion is free from any soap or dispersing agent except alkali and is made by milling the polymer in presence of water and alkali such as sodium carbonate, sodium hydroxide, ammonia and sodium bicarbonate. This dispersion is first applied to the surface by spraying, painting, dipping, etc., then dried and the isocyanate is applied by a similar method in a solution or dispersion in an inert solvent.

Shorter Abstract

Polymerization of Diolefins. 837,689. NV de Bataafsche Petroleum Mij. Filed, January 19 1959. — Butadiene and other conjugated diolefins are polymerized to form polymers with a high content of 1,2 structure by means of a catalyst comprising titanium trichloride and a hydrocarbyl magnesium salt. The polymers are particularly suitable for use in preparing coating compositions, including those used for can coating.

MARCHON SHIPS

Mr Schon, chairman and managing director of Marchon Products Ltd., one of the Albright and Wilson group, announced that an order for two more Marchan ships, each with a carrying capacity similar to that of the *Marchon Trader* — approximately 2,300 tons — had been placed with Clelands of Wallsend-on-Tyne. The announcement was made at a luncheon held to mark the retirement after 50 years' service of Captain J. Coupland, first master of the *Marchon Trader*.

Improvements based on the experience gained with the *Marchon Trader*, carrying phosphate rock from Casablanca to Whitehaven, have been incorporated in the design of these two ships, delivery of which will take place at the end of 1961/beginning of 1962.

O. Secher has been appointed vice-chairman of Solway Chemicals Ltd. and Marchon Products Ltd.

Crop Returns

Unless otherwise indicated the figures quoted, to the nearest thousand lb., represent crop returns for the month stated and for the number of months of the planting company's financial year to date. Corresponding figures are given in parentheses.

October

RUBBER ESTATE AGENCY

Kuala Lumpur—676 (661). 1 mth—676 (661).
Jeram—299 (319). 1 mth—299 (319).
Tamiang (Malaya)—75 (72). 1 mth—75 (72).
Sungei Kahang—178 (179). 1 mth—178 (179).
Bandar Sumatra—95 (100). 3 mths—273 (291).
Batu Kawan—67 (69). 2 mths—135 (133).
Buntar—121 (123). 10 mths—1,129 (1,083).
Kepitigalla—56 (58). 7 mths—423 (378).
Langkat Sumatra—83 (80). 10 mths—766 (740).
Sungei Bahru—140 (137). 4 mths—565 (520).
Tambira—115 (126). 4 mths—437 (458).
Tanjong Malim—406 (409). 4 mths—1,518 (1,561).
Amalgamated Rubber—41 (28). 10 mths—387 (320).
Java Rubber—53 (44). 10 mths—753 (735).
Soember Ajoe—20 (11). 1 mth—20 (11).
Sennah—174 (158). 10 mths—1,397 (1,450).

SHARPE, ESTALL AND CO. LTD.

Anglo-Johore—42 (36). 4 mths—157 (145).
Bekoh C.R.E.—221 (215). 7 mths—1,439 (1,405).
K.P.R.P.—77 (68). 7 mths—462 (441).
Rim (Malacca) R.E.—266 (224). 4 mths—1,053 (904).
Kurunegala—31 (28). 10 mths—274 (249).
Sittang Valley—144 (173). 4 mths—188 (226).

THOMAS BARLOW & BRO.

Bradwell (FMS)—167. 9 mths—1,512 (1,330).
Chersonese (FMS)—75. 9 mths—680 (625).
Highlands & Lowlands Para—2,110. 9 mths—19,566 (18,903).
Krian Rubber—9. 9 mths—66 (94).
Sungei Krian—152. 9 mths—1,599 (1,561).
Muar River—457. 7 mths—2,970 (2,978).

Malaya General—250 (197). 12 mths—2,241 (2,471).
Mengkibol (C.J.)—117 (102). 10 mths—1,008 (874).
Sedenak—230 (184). 12 mths—2,295 (2,200).
Inch Kenneth Kajang—257 (217). 10 mths—2,246 (2.059).
Batu Tiga (Selangor)—193 (190). 12 mths—0 (2,193).
Sungei-Timah Estate (Perak)—37 (38). 7 mths—279 (220).
Beau Sejour—73 (68). 3 mths—183 (157).
Kuala Reman—107.

Rubber Markets

Early publication for Christmas makes it impossible to print up-to-date market prices. They will be quoted in next week's issue.

Blaw Knox Chemical Engineering Co. Ltd. has appointed J. McNicol Bruce engineering manager.

Rubber Statistics

WORLD POSITION IN SEPTEMBER

ADVANCE information on the world rubber situation during September has been given by the Secretariat of the International Rubber Study Group. All figures are in long tons.

NATURAL RUBBER

	Sept.	Jan./Sept.
Production ..	167,500	1,435,000
Deliveries from stockpiles[1] ..	15,000	130,500
Consumption ..	165,000[2]	1,507,500[3]

		Change Since Jan. 1, 1960
STOCKS END PERIOD		
In producing areas	270,000	+ 12,500
In consuming areas	232,500	+ 35,000
Afloat	195,000	- 35,000
	697,500	+ 12,500

[1] Deliveries from the Government stockpiles of the US and UK.
[2] Including estimated imports into the Soviet Union of 16,750 long tons and into China of 4,750 long tons.
[3] Including estimated imports into the Soviet Union of 91,750 long tons and into China of 121,750 long tons.

SYNTHETIC RUBBER

	Sept.	Jan.-Sept.
Production ..	150,000	1,435,000
Consumption ..	150,000	1,327,500

		Change Since Jan. 1, 1960
Stocks end period	362,500	+ 52,000

Indonesia

Reported exports of rubber from Indonesia during September 1960 amounted to 49,050 long tons, of which 16,041 long tons were reported as being of estate origin. Total reported exports during the period January/September 1960 amounted to 398,120 long tons.

France

The French Ministry for Industry and Commerce has issued rubber statistics for September. Figures are in tons, and August figures are also given for comparison.

CONSUMPTION

	Sept.	August
Natural rubber ..	10,323	3,355
Latex	1,234	448
Synthetic rubber ..	8,965	3,278
	20,522	7,081

ENTRY INTO PLANTS

	Sept.	August
Natural rubber ..	8,474	5,578
Latex	1,076	457
Synthetic rubber ..	8,417	5,390
	17,967	11,425

STOCKS AT END OF MONTH

	Sept.	August
Natural rubber ..	17,739	19,588
Latex	1,546	1,704
Synthetic rubber ..	14,398	14,946
	33,683	36,238

Vitel Protection

Tough plastic coatings that protect the bright, new look of wheel covers and other automotive trim against scratching, rust and other corrosion, are one of the applications of Vitel, a new polyester coating resin, from Goodyear of Akron.

Produced in a resin or pellet-like form, it can be made into clear or tinted liquid solutions that form hard, glossy protective films.

IRI/PI Joint Conference

RUBBER AND PLASTICS IN CABLES

THE Institution of the Rubber Industry and the Plastics Institute have arranged a one-day conference on Rubber and Plastics in Cables, to be held on March 1 1961, in the building of The Institution of Electrical Engineers, Savoy Place, W.C.2.

Applications to attend the conference, admission to which will be by ticket only, must be made to either institution before February 14. Conference fee is £1 for members of either institution, £2 for non-members and 10s. for registered students of either institution.

Lectures to be given are as follows: Problems of Electricity Transmission by Sir Christopher Hinton (Central Electricity Generating Board); The Electrical Properties of Polymeric Insulating Materials in Power Cables by N. Parkman (Electrical Research Association Laboratory); Use and Performance of Trailing Cables in Mining by W. C. Symes (NCB); Stabilization of Plastics Insulating Materials for Wire and Cable by W. L. Hawkins (Bell Telephone Laboratories); Telecommunications with Particular Reference to Cables and Their Requirements by R. J. Halsey (Post Office Engineering Dept.); The Application of Fluoroelastomers in the Cable Industry by K. H. Whitlock (Du Pont (UK) Ltd.); Nitrile Rubber and Vinyl Mixtures by C. Y. Almond (I.C.I. Ltd.); Butyl Rubber in Cables by A. G. Strong (Esso Petroleum Co. Ltd.); Irradiation of Polymeric Materials by R. M. Black (BICC Ltd.); and Recent Development in the Use of Neoprene for Wire and Cable, by K. H. Whitlock (Du Pont (UK) Ltd.).

Part of a consignment of 20,000 lead bars of various sizes which have been given an anti-corrosive coating by Plastic Coatings of Guildford, using paste based on Geon 121 resin. They have been specially designed for the atomic submarine, H.M.S. 'Dreadnought'

Another Epikote Resin

Shell Chemical have added a medium-viscosity plasticized grade of epoxide resin — 'Epikote' 817 — to their range. The plasticizer is said to result in a reduced exotherm during reaction and also gives an increase in the 'pot-life' of the system compared with other 'Epikote' resins.

The company says that 817 is therefore particularly useful for electrical work where cure must be effected at or near room temperature. The plasticizer imparts a certain degree of flexibility on the cured product which serves to resist cracking due to thermal stresses. The new grade is also useful for laminating applications due to its longer 'pot-life' at room temperature.

Sheffield Plastics Exhibition

BX Plastics Ltd. are holding a two-day plastics exhibition and symposium at the Grand Hotel, Sheffield, on February 21 and 22 1961. A programme of papers on packaging, design trends, technical and other uses of plastics will take place against a background of an exhibition of materials and their products.

Tickets are available from the Publicity Department of BX Plastics, London, E.4.

Industry INTELLIGENCE

Technical Data

Thiofide EP

Thiofide EP is Monsanto's new name for an improved grade of benzthiazyldisulphide of fine particle size which disperses rapidly in all types of rubber. Its accelerator activity and curing characteristics are identical to those of the regular grade of Thiofide (MBTS).

This easy processing grade was developed principally for use in tyre, inner tube and cable manufacture, but is recommended for any application where particularly good dispersion of accelerator is required. It disperses more rapidly than other forms of MBTS, can be more readily incorporated either on an open mill or in the internal mixer and enables masterbatches to be produced more quickly.

Details on the properties compounding characteristics and experimental procedures are given in Laboratory Report No. LA5/1 available from Monsanto Chemicals Ltd., 10-18 Victoria Street, London, S.W.1.

Polysar Products

The compounding details and properties of a hard microcellular soling stock are described in Polysar Technical Report No. 9:11A available from Polymer (UK) Ltd., Walbrook House, Walbrook, London, E.C.4. This stock is based on a blend of Polysar SS-250 with Polysar Krylene 602, it mixes easily, moulds well and cures to a smooth surfaced vulcanizate which has a leather-like appearance and feel and an extremely good flex life.

Technical Report No. 9:11B compares Polysar Kryflex 202 with Polysar Krylene NS in compounds containing 30phr of various ester plasticizers. 202 is a gel-free SBR polymerized to high molecular weight. The resulting high viscosity enables it to accept high plasticizer loadings while retaining good physical properties, important for such properties as flame resistance or low temperature flexibility.

Bedafil NL

Bedafil NL is a new synthetic resin filler, in the form of an aqueous dispersion, developed by the Dyestuffs Division of I.C.I. Ltd., for filling light leathers. It gives excellent results on full-chrome suedes as well as on grain leathers, being applied in either case by simple drumming to give leathers of full, uniform substance and improved cutting value, together with mellow handle and good affinity for dyes.

This is a very fine dispersion, specially stabilized to withstand a wide range of processing conditions, and contains 50% by weight of solid resin. There is a slight weakening effect on the shades obtained on subsequent dyeing, but this is unimportant except in the case of very heavy shades.

Leathers of better tensile strength and better dyeing properties (which may be satisfactorily dry-cleaned with white spirit or perchloroethylene), are obtained when Bedafil NL is used to replace the vegetable tannins normally employed following chrome tanning.

Auxiliary Products Literature No. 128, issued by the Dyestuffs Division of I.C.I., gives full data on the new product and recipes for its application to leathers of different types.

Machines, Materials and Equipment

Disposable Overalls

For a number of industrial applications, a disposable paper overall has advantages over a cloth one which has to be laundered.

This applies, for example, in spheres involving radioactive materials, and in parts of the polymer industry. It is also the case with paint spraying, or other processes involving gross contamination beyond the scope of easy laundering.

To meet this requirement, a range of overalls has been introduced, made of strong paper which is soft enough to drape well for comfort and good appearance in wear.

These overalls can be sterilized and their electrostatic properties and alkali and acid resistance are comparable with those of a cotton fabric. The material is water-resistant, and flame proof.

Time Indicator

Electromechanical elapsed time indicators are commonly used to register the total time of operation of electrical and electronic equipment. An alternative very simple device is now available to register elapsed time of operation by electrochemical means. The instrument is simply connected across the terminals of the equipment to be timed, and involves no switches, relays, or mechanical operation.

The unit contains a simple cell, in the form of a replaceable cartridge, consisting of anode, cathode, and electrolyte. As current passes through the cell, the anode is progressively consumed; its length correspondingly decreases, and the design is such that this length can be read off on a scale calibrated directly in hours of operation.

According to requirements, the cartridge can be supplied for AC or DC voltages from 6 to 300 volts, and for total operating times of 100, 500, 1,000 or 10,000 hours, by Industrial Instruments Ltd., 9 Paved Court, Richmond, Surrey.

Lettering Instrument

Lettering on drawings and for various kinds of display work will be simplified and speeded up by the development of a new lettering instrument developed in the USA and available from the Varigraph Division of General Trade Equipment Ltd., 82-90 Seymour Place, London, W.1.

Instead of conventional stencils, the instrument uses a pantograph principle; the master letters on an engraved metal template are traced out with a stylus, and this controls the movement of the pen through a mechanism which allows the size of lettering to be greater or less than that of the template.

The degree of enlargement or reduction is set independently for the vertical and horizontal directions; as a result, tall thin letters or elongated squat letters can be produced from the same template. The mechanism is precision made, and controls are provided by which the height and width of the letters produced from the standard template can be adjusted and read off directly in thousandths of an inch.

Publications

Laboratory Glassware

Griffin and George, laboratory furnishers, have issued a price list of Volumetric and Lampblown Glassware. The catalogue (P.2121) comprises some 60 pages, and is profusely illustrated with a wide range of 'Griffin' and 'E-Mil' glassware, including burettes, flasks, pipettes, butyrometers, soxhlet extractors and viscometers. Copies are available free from any of the Group's Regional Offices.

Redux Bonding

Metal-to-metal bonding by means of adhesives has been widely adopted in the aircraft industry, as it offers advantages such as increased strength, simpler design, lower production costs and easier maintenance.

Technical Notes 216 from the Technical Service Department, Ciba (ARL) Ltd., describes the making by the French Company Sud-Aviation of the main and tail rotor blades for the Alouette II helicopter. In common with other helicopters these blades are of bonded construction, the main rotor blades being over 16ft. long. These consist of a forged light alloy spar to the leading edge of which is bonded a folded aluminium alloy skin which projects behind the spar to form the trailing edge.

COMPANIES in the NEWS

Rubber Regenerating

At the annual general meeting of the Rubber Regenerating Co. Ltd., the chairman, T. A. Clayton, said that the results of the year had turned out to be the most successful that the company had ever achieved. Business throughout the period had been at high pressure.

The trading profit of £616,431 before taxation showed an increase of £82,827 over last year's record figure. The charge for depreciation and obsolescence of plant and machinery was £24,754 higher than the corresponding figure last year, this being due to the additional plant and machinery installed. In the balance sheet fixed assets had increased by £56,949, and the current assets are up £176,887, exceeding current liabilities by £759,030.

BIP

British Industrial Plastics announces a final dividend of 10%, making 16% for the year to September 30 1960, an effective increase of 4½% over the previous year's equivalent.

Group profits increased from £1,113,026 to £1,484,185, and the net taxed balance from £445,616 to £589,819.

Insulated Delivery Van

A new type of insulated delivery van, the bodywork of which is made from glass-fibre reinforced Bakelite polyester resin, is being produced by Mann Egerton and Co Ltd., of Norwich. The body framework is built almost entirely from 4in. x 1in. U-channel sections fabricated from GRP. On the sides of the vehicle, these sections are bonded together with reinforced resin angle pieces and the whole structure secured to the floor bearers with metal brackets. The floor framework is also made from the plastics U-sections, with steel reinforced plates in every joint.

The van is fully insulated with 3ft. x 2ft. x 4in. polystyrene foam blocks which are slid into the U-channel sections.

The exterior bodywork consists of self-coloured pre-fabricated reinforced resin panels which are fixed horizontally to the U-sections with polyester resin. Inside the floor is made from $\frac{5}{16}$in. plywood overlaid with GRP. A final coating of the polyester resin mixed with a high proportion of abrasive grit imparts to the floor a non-skid, durable surface. This use of plastics has allowed the payload to be increased by 3cwt.

Underwater demonstrations by experts using aqua-lung equipment will be a feature of the International Boat Show at Earls Court from January 4-14.

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M. Stationery Office.

HYDRAC (808,505) Synthetic resins and synthetic resin plastics in the form of powders, pastes, liquids, emulsions, dispersions, pellets and granulates; all for industrial use. CIBA Ltd., 141 Klybeckstrasse, Basle, Switzerland. Address for service is c/o Abel and Imray, Quality House, Quality Court, Chancery Lane, London, W.C.2. (Class 1; November 30 1960).

HI-LANDER (799,551) Tyres for vehicles. The Goodyear Tire and Rubber Co., 1144 East Market Street, Akron, State of Ohio, United States of America. Address for service is c/o Marks and Clerk, 57 and 58 Lincoln's Inn Fields, London, W.C.2. (Class 12; November 30 1960).

BRITACELLA (B782,811) Blackboards, paper and films of thermoplastics, all for wrapping purposes, pasteboard included in Class 16 and cardboard, all being impregnated or coated with synthetic materials; and paper and cardboard, all for use in the manufacture of lampshades. Carl Schwarz, Heinz Burgtorf, Otto Benecke, Egon Schwarz and Johann Heinrich Benecke, trading as J. H. Benecke, 40 Benecke-Allee, Hannover-Vinnhorst, Germany. Address for service is c/o Potts and Co., 15 Hamilton Square, Birkenhead. (Class 16; November 30 1960).

SAFCA (807,397) Devices made wholly or principally of plastics for fitting to containers to dispense their contents in powder, aerosol, spray or similar form; and containers included in Class 20; all being goods sold separately or in combination. Safca Aerosol Valve Co., Ltd., Milbanke Way, Bracknell, Berkshire. (Class 20; November 30 1960).

Fishnet needles injection moulded from Erinoid cellulose acetate by the Plastics Division of Universal Metal Products Ltd. (U.M.P.) of Salford, Lancs., for William Kenyon and Sons Ltd. The needles, manufactured on a 2-oz. machine, are in deep blue with raised lettering hot-stamped in gold

PNEUMANT (800,966) Tyres for vehicle wheels and inner tubes therefor; protective or decorative rings for attachment to vehicle tyres to convert them into white-walled or coloured-walled tyres; and protectors for the inner tubes of tyres. Veb Reifenwerk Fürstenwalde, Tränkeweg, Fürstenwalde-Süd (Spree), Germany. Address for service is c/o H. A. L. Venner, 1 Great James Street, Bedford Road, London, W.C.1. (Class 12; December 7 1960).

POLY-GLASS (804,089) Trucks, trolleys (vehicles) and wheeled containers, all made wholly or principally of glass fibre materials. Norman Roffe (Poly-Glass) Ltd., 11 South Road, Morecambe, County of Lancaster. (Class 12; December 7 1960).

NEW COMPANIES

Welbar Products Ltd. (672,613).—October 14. Capital: £600 in £1 shares. To carry on the business of dealers in plastic goods, etc. The first directors are to be appointed by the subscribers. Solicitors: Titmuss Sainer and Webb, 2 Serjeants Inn, E.C.4.

Cheri-Foam Ltd. (673,287).—October 24. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in synthetic foam rubber and goods made of natural and synthetic rubber, etc. The first directors are: Kurt A. Oppenheim, Tower House, Corkickle, Whitehaven; Harold A. Howard, Flat 3, 24 Lowndes Square, S.W.1.

Walsall Rubber Co. Ltd. (673,822).—October 31. Capital: £5,000 in £1 shares. The first directors are: Eileen M. Pitt and Anthony G. Pitt, both of The Red House, Park Road, Hagley, Worcs.; Mrs. Susan E. Green, The Cottage, Mill Lane, Wychbold, Droitwich, Worcs.; Fanny James, 126 Green Lane, Walsall. Regd. office: 126 Wolverhampton Street, Walsall.

F. Boxon & Co. Ltd. (672,099).—October 10. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in fancy goods of all kinds, plastic, rubber, leather, vulcanite, ebonite and goods manufactured therefrom, etc. The first directors are to be appointed by the subscribers. Regd. office: 195 The Vale, N.W.11.

A. E. Annis Ltd. (672,144).—October 10. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in plastics, etc. Aubrey E. Annis, 7 Highbourne House, Marylebone High Street, W.1 (plastic manufacturer), is the first director. Regd. office: 3 and 4 Clements Inn, W.C.2.

Callistet Ltd. (667,193).—August 10. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in plastics, etc. Secretary: Stanley H. Lucas. Regd. office: 6 Surrey Street, W.C.2.

Ador Plastics Ltd. (671,090).—September 27. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in plastic modelling and moulding materials, substances and compositions, etc. The first directors are: Mordchy Ludmir, 9 Paget Road, N.16; Gertrude Pinter, 61, Heathland Road, N.16. Regd. office: 202 Bishopsgate, E.C.2.

Latest Wills

Mr Thomas Mould, of 55 Clare Street, Basford, Stoke-on-Trent, and Oaklands Caravan Site, Coven, Brewood, Staffs., traffic inspector at the Goodyear Tyre and Rubber Co., who died on September 7, left £2,063 gross, £2,006 net value.

Mr William Orrin, of 46 Coombe Road, Chelmsford, Essex, formerly of Baddow Road, Chelmsford, who formerly had a vulcanizing and tyre business, and who died on October 15, left £4,267 15s. 9d. gross, £4,198 1s. 3d. net value.

Mr. H. W. F. Ireland, of 17 Manscombe Road, Livermead, Torquay, Devon, a pioneer of the plastics industry in Birmingham, founder of Moulded Products, Erdington, who died on September 25, aged 76, left £83,724 1s. 8d. gross, £83,541 5s. 2d. net value. (Duty paid £37,659).

Latest Wills

Mr Christopher Percy Edwins, of 14 Lancot Avenue, Dunstable, Beds., proprietor of the Dunstable Tyre and Rubber Co., who died on January 8, left £10,286 10s. 8d. gross, £9,482 0s. 2d. net value.

Colonel Aubrey Woodford Wallich, O.B.E., M.C., of 44 Clifton Hill, N.W.8, formerly of Nutbourne, Sussex, a former chairman and member of the Rubber Growers' Association, who died on September 6, aged 64, left £30,619 14s. 8d. gross, £30,471 9s. 6d. net value.

Increases of Capital

Spalding Tyre Co. Ltd. (314,336). Commercial Road, Spalding. — Increased on March 17 1960, by £40,000, in £1 ordinary shares, beyond the registered capital of £1,000.

Gerland Ltd. (613,508). Rubber and plastic goods manufacturers, etc., 130 Mount Street, W.1.—Increased on February 18 1960, by £4,000, in £1 ordinary shares, beyond the registered capital of £1,000.

Changes of Name

Z. and T. Karas (Plating) Co. Ltd. (535,667), Central Chambers, Caerphilly, Glam.—Name changed to Plastics and Refrigeration (Cardiff) Ltd. on March 11 1960.

Earl Plastics Ltd. (550,967), 66 Moor Street, Birmingham, 4.—Name changed to G. W. Warwick Ltd. on March 9 1960.

Alper Bros. (Plastics) Ltd. (644,726), 34 South Molton Street, W.1.—Name changed

Household Specialities Ltd. (477,591), 12 Bruton Street, W.1.—Name changed to Intercon (Rubber) Trading Ltd. on April 22 1960.

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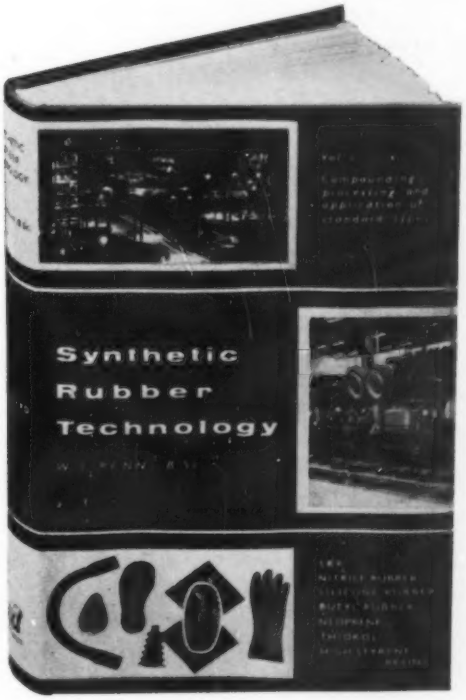

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